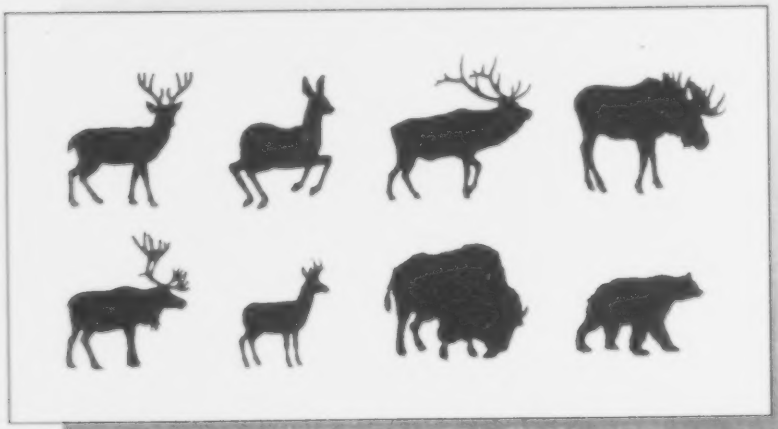
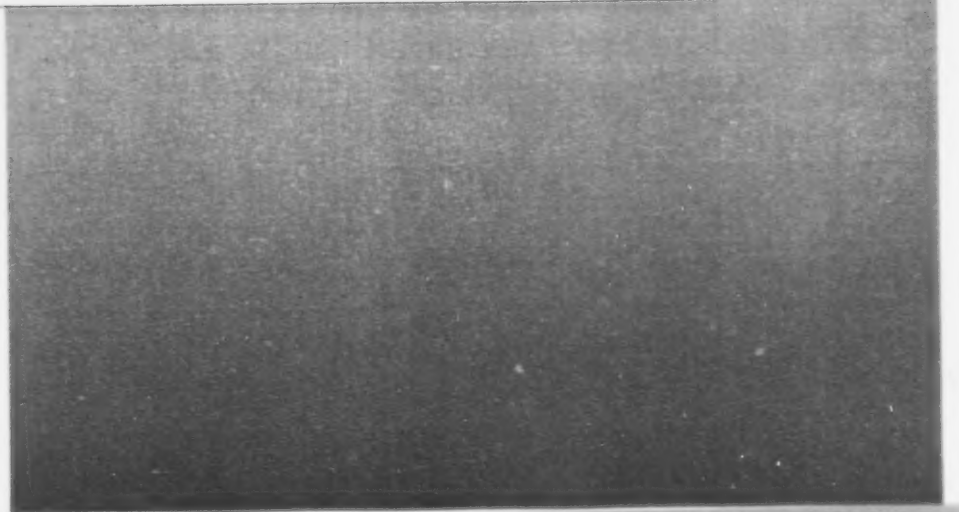
Saskatchewan Environment

Status and Management of Wildlife in Saskatchewan

2002 and 2003

Resource Technical Report 2005-2





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Status and Management of Wildlife in Saskatchewan, 2002 and 2003

Resource Technical Report 2005-2

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Executive Summary

License Sales and Harvests

Table 1. Hunting license sales and estimated harvests, 2001–2003.

	Licenses Sold				Licensed Harvest			
	2001	2002	2003	10-yr Mean (1994-03)	2001	2002	2003	10 yr Mean (1994-03)
Wildlife Habitat Certificate	68,001	69,145	70,470	71,226	–	–	–	–
Big Game								
White-tailed Deer [a]	45,615	46,578	49,482	58,598	32,870	33,987	34,287	41,937
Mule Deer	8,068	12,645	14,582	9,097	6,260	9,833	21,403	7,830
Elk	6,735	6,610	7,214	6,524	2,245	2,029	2,673	1,866
Moose [a]	10,488	7,020	6,633	9,622	4,151	1,883	2,252	3,189
Barren-ground Caribou	32	49	27	45	?	?	?	?
Pronghorn Antelope	0 [c]	350	502	426 [d]	0 [c]	322	458	390 [d]
Black Bear [a]	4,300	4,520	4,332	3,968	2,337	2,383	2,282	2,179
Coyote	452	525	555	512 [e]	?	?	?	?
Big Game Total	75,690	78,297	83,327	88,792	47,863	50,437	60,945	57,391
Upland Birds								
Sask. Resident	13,573	12,462	14,231	15,287	–	–	–	–
Canadian Resident	1,475	1,443	1,583	1,642	–	–	–	–
Non-resident	8,296	8,666	10,148	7,758	–	–	–	–
Sharp-tailed Grouse	–	–	–	–	45,828	36,496	52,950	38,683
Ruffed Grouse	–	–	–	–	33,056	13,098	32,247	44,267
Spruce Grouse	–	–	–	–	7,711	3,966	5,385	9,012
Hungarian Partridge	–	–	–	–	76,807	82,318	118,697	63,022
Ring-necked Pheasant	–	–	–	–	4,639	3,368	7,423	6,923
Upland Bird Total	23,344	22,571	25,962	24,687	168,041	139,246	216,702	161,907
Youth License	6,704	6,791	6,579	5,110	–	–	–	–
Total Licenses Sold	173,739	176,804	186,338	189,815	–	–	–	–

[a] includes Canadian and non-resident statistics. [b] unknown. [c] no hunting season. [d] 2-yr mean. [e] 4-yr mean.

License Revenue

Table 2. Gross revenue from license sales, 2001–2003.

License Type	2001	2002	2003	10-yr Mean (1994 - 2003)
Wildlife Habitat Certificate	$ 661,342	$ 694,954	$ 681,742	$ 690,281
Big Game [a]	3,873,098	4,287,114	4,130,304	4,109,682
Game Bird	1,105,905	1,190,100	1,342,598	1,099,925
Youth	55,506	57,843	53,898	46,123
Total	$ 5,695,851	$ 6,140,911	$ 6,208,542	$ 5,946,011

[a] does not include revenues from non-resident allocation licenses.

Table 3. License revenue by big game species, 2001–2003.

Big Game Species	2001	2002	2003	10-yr Mean (1994 - 2003)
White-tailed Deer	$ 2,570,832	$ 2,730,062	$ 2,703,560	$ 2,825,258
Mule Deer	248,446	362,719	420,680	274,458
Elk	247,175	358,967	264,385	243,641
Moose	405,604	313,765	328,644	394,313
Barren-ground Caribou	987	329	247	907
Pronghorn Antelope	0	12,430	18,076	43,934
Black Bear	400,054	419,742	394,712	327,171
Total	$ 3,873,098	$ 4,287,114	$ 4,130,304	$ 4,109,682

Big Game Population Status

Table 4. Status of big game populations in relation to population objectives.

Species	Estimated 2003 Winter Population	Long-term Population Objective	Prop (%) from Long-term Pop. Objective	Status / Performance Measures
White-tailed Deer	369,263	324,985	+13.6%	➢ Prairie populations (WMZs 1 – 30) are stable but productivity lower than desired. Populations on farmland habitat (WMZs 15-30) are stable but habitat limited. ➢ Parkland populations (WMZs 31-47) have increased slightly except for those in the southeast (WMZs 31-37). Parkland winter populations are about 5% above the long-term average. ➢ Forest Fringe populations growing in central and western areas due to mild winter conditions. ➢ Forest populations growing due to mild winter conditions.
Mule Deer	43,028	43,904	-1.0%	➢ Grassland populations have increased to 3% below their long-term average size, with an increasing trend. ➢ Farmland populations have increased to 2% below their long-term average, with an increasing trend. ➢ Parkland populations are stable and slightly above the long-term average. ➢ Forest fringe populations are very small, but estimated to be at their long-term average.
Elk	14,782	14,900±10%	+1.2%	➢ Populations in most of the 22 elk management units (EMUs) are at or near their population objectives. The exceptions are Cypress Hills where populations have greatly exceeded their population objectives, and Cumberland Delta, Bronson/Divide, PANP/Cookson, where populations are lower than desired. ➢ There are a lack of recent survey data for most EMUs, so population status is interpolated from population forecasts based on past population performance, hunter harvest and hunter success rates.
Moose	43,196	50,080±10%	-13.7%	➢ Island populations (11 MMUs) are stable and near their population objectives. ➢ Northern MMU populations (3 MMUs) are considered stable. ➢ Pasquia and Porcupine MMU populations were 12% below their population objectives, due to moose tick mortality (spring 2002), and over-harvest of mature bulls. ➢ The Cumberland MMU population remains 54% below population objective. ➢ Central forest populations (2 MMUs) are 31% below population objectives. ➢ West forest populations (3 MMUs) are about 5% below population objectives.
Barren-ground Caribou	?	>300,000	?	➢ Last survey was in 1994 with population estimate of 776,000.
Woodland Caribou	4,250	?	?	➢ Status is under review.
Pronghorn	13,506 [a]	20,803 [a]	+9.0%	➢ 2003 population surveys indicate the provincial population has surpassed the long-term average.
Black Bear	35,000	35 - 40000	?	➢ There are no formal population surveys for this species. Population estimates are a "best guess" based on habitat potential, population harvest levels, and hunter success rates.

[a] Fall (pre-hunt) population estimate.

Big Game Allocation Changes

Table 5. Allocation changes, 2002 and 2003.

Species	Year	Allocation Change
White-tailed Deer	2002	➢ Rifle season reduction from 5 to 3 weeks in WMZ 42 (west of hwy 6), and south portion of WMZ 54, to better distribute hunting pressure. ➢ Introduced an antlerless rifle season in WMZ 53, north portion of WMZ 54 and RMZ (primitive weapons only) to take advantage of growing populations. ➢ Closed the Nov 25-30 season in WMZ 7 to eliminate party hunting for elk by white-tail deer hunters. ➢ Non-resident license was modified to include a head/antler seal, which allows for easier export out-of-province.
	2003	➢ Introduced a 2nd either-sex license in forest zones (WMZs 56-69) for resident hunters, to take advantage of increasing deer populations responding to a series of mild winters.
Mule Deer	2002	➢ Either-sex season was re-opened for WMZ 18. ➢ Antlerless season was opened in WMZs 1, 3, 7, 15, 18, 19, 20, 25, 26, and 27. ➢ Either-sex season opened for WMZ 43 with quota of 25.
	2003	➢ Antlerless bag limit increased from 1 to 2 deer in WMZs 1, 2, 3, 5-14, 23-29, 45, and 46 to stabilize growing populations.
Elk	2002	➢ A 1-week either-sex season was opened in WMZ 54 with a quota of 25 licenses.
	2003	➢ All WMZ 7 licenses were for antlerless elk, to attempt to reduce population growth rate.
Moose	2002	➢ Either-sex draw quotas reduced in WMZs 48, 49, 56 combined (from 100 to 50), WMZ 58 (from 50 to 25, WMZ 59 (from 75 to 50), and Greenwater Lake Prov. Park (from 50 to 25), to reduce harvest pressure on cows in response to tick-related mortality in spring 2002. ➢ Early regular season was cancelled in WMZs 43, 48, 49, 50, 53, 56-67, and 69 , including Narrow Hills, Meadow Lake, Wildcat Hills, and Clarence-Steepbank Lakes Prov. Parks, and Round Lake Recreation Site. This was to prevent shifting of hunting pressure and to compensate for moose population loss due to tick-related mortality.
	2003	➢ Early regular season remained closed as in 2002. ➢ Saskatchewan resident archery season reduced to 1 week (Sep 22-27). ➢ Guided moose licenses in Cumberland (WMZs 61 and 62) reduced from 184 to 90. ➢ Either-sex draw quota reductions of 2002 remained in place.
Pronghorn	2002	➢ Buck-only season opened in Govenlock (WMZs 3, 6, 7; quota 150), and Frenchman (WMZ 2, 4, 5; quota 200) pronghorn management units.
	2003	➢ Buck-only season continued for Govenlock (quota 150) Frenchman (quota 200) and a portion of Great Sandhills (WMZs 8, 9; quota 150) pronghorn management units.
Bear	2002	➢ No changes.
	2003	➢ No changes.
Coyote	2002	➢ No changes.
	2003	➢ No changes.

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Methods

1.0 Data Collection Techniques

1.1 Ungulate Population Surveys

In Saskatchewan, aerial surveys are the fundamental technique used to estimate ungulate population parameters. Surveys are primarily conducted in the winter months when there is sufficient snow background on which to observe animals and deciduous leaf cover is lacking. Notable exceptions are pronghorn antelope surveys, which are flown in the June (population density) and July (population structure). Generally, the survey technique employed depends upon the species being observed and the type of information the survey is designed to collect. The following is a brief description of various survey approaches used by Saskatchewan Environment (SE):

- **Trend Line Aerial Survey** design is the oldest survey method used in the province. Some of the first trend line surveys flown in Saskatchewan occurred in 1949 when Montana, Alberta and Saskatchewan combined efforts to estimate their collective pronghorn antelope resource. The survey design basically consists of transect lines a fixed distance apart and a fixed distance in length. Observers in the aircraft look out a fixed distance from the aircraft depending upon survey design and record animal sightings. See Dirschl (1960) and Hayne (1949) for a more detailed description of trend line aerial survey techniques. This survey approach was replaced by the line-transect survey design.

- **Line-Transect Survey** design is very similar to the trend line survey in that predetermined lines are flown over a designated area. However, the major procedural difference sees the placement of animal clusters into distance bands perpendicular to the transect line. Survey data are entered into a computer program that creates five best-fit mathematical models of the population density estimator. The theoretical advantages of this survey design are that each density estimator is more easily derived (with confidence intervals placed on its value), it is as cost effective as trend line surveys, and observability biases that increase with distance from the aircraft are accounted for in the mathematical model calculations. In 2000, SE began using DISTANCE 3.5 release 5 to assess survey results (Buckland et. al. 1993, Guenzel 1997).

- **Stratified - Random Block Survey** areas are stratified into sample units (quadrats or blocks) based on habitat type. Sample units are randomly selected from each strata. With this method, observers strive for a population density estimate of ±20% within 90% CI for the survey area. Refer to Stewart (1983) for a complete explanation of the stratified random block survey technique used in Saskatchewan.

- **Modified Gasaway Survey** - Beginning in the winter of 1997/98, a modified form of stratified random quadrat surveys based on the method described by Gasaway et al. (1986), and Lynch and Schumaker (1995) was adopted for moose. The modified Gasaway survey method differs from that used in previous years in that the survey units are larger and are stratified based on population densities determined from a pre-flight survey versus stratification based on habitat type. Once all survey units are classified into population density strata, survey units are selected from each strata at random and intensely searched by helicopter. Observers strive for a population density estimate of ±20% within 90%CI for the survey area. Population structure data are collected concurrently during the intensive search.

- **Population Structure Surveys (aerial based)** are designed to estimate an age (i.e. adult vs. young) and sex composition of ungulate populations. Structures are usually presented as a ratio of adult males or young per adult female or per 100 adult females. Flight paths are usually irregular and occur over habitat types where the probability of sighting animals is high. Minimum animal observations to obtain precise estimates within desired confidence intervals are calculated before the survey per Czaplewski et al. (1983) and Scheaffer et al. (1990).

- **Co-operative Deer Management Survey (CDMS)**. A SE sponsored ground-based survey of white-tailed deer and mule deer population structures is conducted annually between Sep. 1 and Nov. 30, inclusive. The survey is conducted with the assistance of conservation officers, members of sport hunter groups and the general public. Co-operators classify observed deer by species (whitetail or mule), sex (male or female), age (fawn or adult), productivity (#fawns/doe) and provide information on buck antler development. These surveys supply valuable information on herd structures in many areas of the province where aerial population structure surveys were not carried out due to provincial monitoring priorities and limited budgets.

- **Spotlight Surveys** are a less expensive, ground-based population survey technique that is conducted from time to time often to supplement areas where CDMS samples were too small to be meaningful. These are primarily conducted on deer at night, to derive composition estimates for herds in localized situations. Observers usually drive into a field or along a road and shine a powerful spotlight over the area of view. The species, number, age and sex is determined for the night feeding deer.

1.2 Population Status Assessment Models

It is not logistically possible to collect population data (size, structure) for all species throughout their range. Consequently, population status assessment models were developed to aid with assessing the status of ungulate (specifically white-tailed deer, mule deer, elk, moose and pronghorn antelope) populations at the provincial scale and meta-population scale. The first step of model development was to define the species range, and then partition the range into meta-populations (management units or wildlife management zones). Meta-population models were then constructed for individual management units (elk, moose, antelope), or wildlife management zones (white-tailed deer, mule deer) for a particular species using survey data. Linear interpolation of survey data was used between survey years for individual meta-populations. The sum of the meta-population estimates for a given year are then used to calculate a provincial total for that year for a given species. The more frequently a specific meta-population (management unit or wildlife management zone) is surveyed, the more accurately the model approximates the true population dynamics of that meta-population.

It is essential that surveys be conducted as regularly and extensively as possible to facilitate effective population assessment both at the provincial and meta-population scales. There are several meta-populations (usually small fringe populations or very low density populations) which have been infrequently surveyed, or that lack survey data, or may only have a "best guess" estimate based on a combination of field reports from local Conservation Officers and/or Regional Biologists, hunting activity, and harvest success rates. In these circumstances, the only option was to use adjacent meta-population trends to model population dynamics for meta-populations that are data deficient. This approach can, and probably does, introduce additional uncertainty (reduced accuracy and precision) into calculating an annual provincial population estimate for a particular species. The uncertainty can be reduced by more frequent and extensive sampling of meta-populations where logistically practical and/or monetarily feasible. For this reason the elk, moose and pronghorn antelope population forecasting models are more accurate and precise than the white-tailed deer and mule deer models.

Meta-population models are recalibrated as new survey data are collected. The models can be used to forecast population growth based on the population dynamics past performance and harvest from various population segments. However, it is absolutely essential that populations be surveyed

regularly to ensure effective management, so that the models can be re-calibrated to more accurately represent and assess population status, and to monitor population performance relative to management strategies.

1.3 Biological Sample Collections

Twelve (12) privately operated collection points (Checking Stations) and 76 SE district offices were used to obtain biological samples to determine sex, age and antler configuration of harvested moose and elk, and sex/age of harvested black bears. Age determination for harvested animals older than young-of-the-year, were based on tooth cementum deposition (moose, elk, white-tailed deer and black bear), and/or molar wear (white-tailed deer only). Moose cementum analysis was conducted by trained SE, Fish and Wildlife Branch staff. Cementum analyses for the other species (elk, white-tailed deer, black bear) were conducted by Matson's Laboratories in Milltown, Montana, USA.

The SE district offices served as collection points for acquiring white-tailed deer, mule deer and elk heads for Chronic Wasting Disease sampling.

1.4 Hunting and Harvest Statistics

1.4.1 License Sales

SE, Fish and Wildlife Branch conducts an annual computerized draw for elk, moose, either-sex and antlerless mule deer, and pronghorn licenses.

Over-the-counter licenses for white-tailed deer, black bear, moose (bull-calf), elk (bulls-only) and game bird seasons are purchased annually through approximately 1,000 public vendors and SE district offices located throughout the province. Vendors return sold and unsold licenses to SE, which then determine provincial license sales figures for each game species.

1.4.2 Hunter Harvest Survey (HHS)

Continued monitoring of the harvest is essential to evaluate implications of harvest strategies. This is accomplished using a mail-out questionnaire to survey ungulate and upland game bird harvest, and hunting activity by licensed resident hunters. Phone surveys were used to supplement the information for elk and moose. Outfitter records were used to collect non-resident harvest and hunting activities for white-tailed deer and black bear.

The current year's hunters were selected for each of the big game draw species. This sample was then augmented with the previous year's white-tailed deer, bull-calf moose and bull-only elk hunters. Regular and draw license holders were cross-referenced to avoid duplication of hunter sampling. White-tailed deer are our most important ungulate species based on hunter participation and economic value, yet may be the most difficult species to obtain adequate samples in each WMZ. Therefore, the timing of the survey (end of November) was meant to ensure the best possible number of survey returns with white-tailed deer hunt information. Each questionnaire was numbered uniquely and mailed to a total of 27,500 resident hunters.

Resident hunters were not specifically sampled for upland game bird hunt activity as acceptable survey representation came from the sampled big game hunters. The HHS is inadequate to sample

Canadian and non-resident hunters. Non-resident hunting and harvest data for black bears and white-tailed deer comes exclusively from outfitter records.

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White-tailed Deer *(Odecoileus virginianus)*

1.0 Long-term Management Objectives

A formal long-term strategic management plan has not been developed for white-tailed deer. The following interim objectives will be used until such time as a long-term strategic plan is available.

- Maintain a winter population of 325,000 ±10%.
- To maintain a provincial autumn herd structure >40 Bucks:100 Does:90 Fawns (measured from CDMS, as 5-year running average).
- To maintain current amount of occupied habitat.
- Adjust allocation strategies within sustainable harvest levels and to meet population objectives.

2.0 Population Status

White-tailed deer population status is determined annually from data provided by aerial population density and/or structure surveys, annual pre-season wildlife observations (Co-operative Deer Management Survey (CDMS)), weather severity measurements, habitat condition evaluations, biological sample collections, deer necropsies, and field reports from the general public, landowners and SE staff. Deviations from the established norm are examined to assess whether populations are changing because of management strategies or other environmental factors.

A population status assessment model (see methods, section 1.2 was used to calculate population sizes in each White-tailed Deer Management Unit (WDMU). The sums of the WDMU estimates were used to calculate an annual total winter population estimate (Figure 1). Figure 2 illustrates the

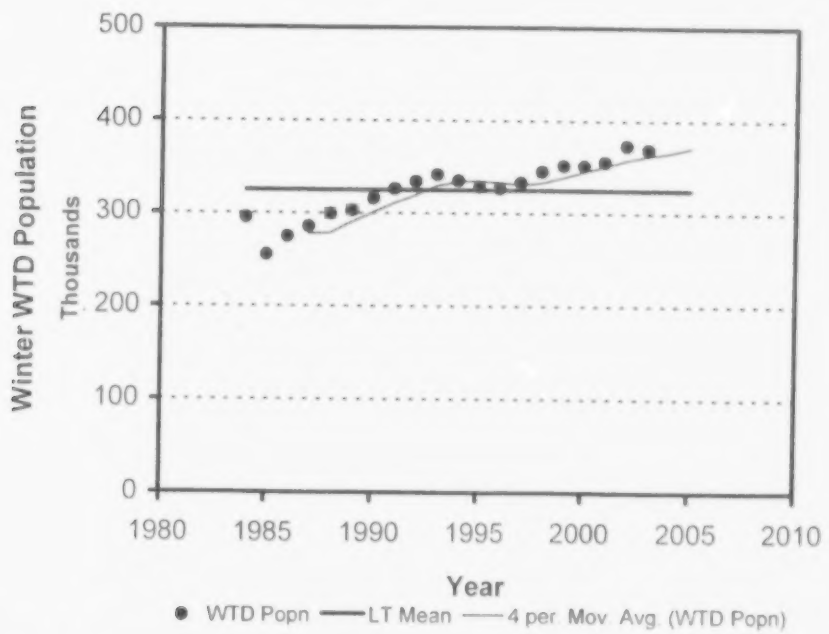

Figure 1. Estimated provincial winter white-tailed deer population in relation to long-term (1984-2003) mean.

WDMUs. The 2003 provincial white-tailed deer winter population was estimated to be 369,263 animals, which is about 14% higher than the long-term (1984-2003) mean winter population size of 324,985 animals (Table 1). These preliminary estimates are subject to change as population inventory data are collected and the model is validated and improved.

2.1 Survey Data

Saskatchewan's deer herd occupies the northern limits of the white-tailed deer range in North America. As such, winter weather is the limiting factor on our provincial deer population. Table 1 summarizes current population density and size in relation to long-term (1984-2003) means based on interpolation from limited survey data. Figure 2 illustrates white-tailed deer range in relation to white-tailed deer management units (WDMUs). Recent population density surveys are summarized in Table 2. No aerial population structure surveys were conducted during the past 5 winters. A summary of autumn (Sep-Nov) population structure by ecozone is presented in Table 3 and by wildlife management zone in Appendix 1.

Results of these survey data indicate:

1. **Prairie** populations (WMZs 1-30) are stable and near their long-term average size, but lower productivity relative to the 1980s and early 1990s is a concern. Populations located in farmland zones (WMZs 15 – 30) are limited by the shortage of quality wintering habitat, particularly on the west side, which limits population size and growth potential.

2. **Parkland** (WMZs 31-47) populations have slowly increased to levels slightly above the long-term average except in the southeast, where liberal hunting seasons, depredation hunting strategies, and severe winters (1995/96, 1996/97 and 2000/01) have combined to reduce them.

3. **Forest Fringe** (WMZs 48–55) populations are subject to higher winter mortality on a more frequent basis relative to southern populations. Recent mild winters have allowed population growth in central and western areas. Fringe winter populations are thought to be about 50% above the long-term average.

4. **Forest** (WMZs 56-69) winter populations in the southern boreal forest are growing similar to those in the Forest Fringe, and are estimated to be about 28% above the long-term average.

5. **Northern forest** populations (WMZs 70-76) are small but probably stable, however this area is data deficient, which prevents reliable status assessment.

Table 1. Summary of white-tailed deer status by ecozone and management unit. Estimates are interpolated from very limited population inventory data and are subject to change.

Ecozone	WTD Management Unit (WDMU)	WMZ	Area (km²)	Winter Density Estimate (#/km²) Mean (1984-03)	2003/04	Winter Population Estimate Mean (1984-03)	2003/04
Prairie (Grassland)	Big Muddy	1	8,251	0.51	0.52	4,167	4,284
	Frenchman	2	10,656	0.50	0.52	5,326	5,533
	Drainage	4, 5	14,136	0.52	0.52	7,374	7,340
	Govenlock	3, 6, 7	11,608	0.61	0.62	7,043	7,241
	Great Sandhills	8 - 10	10,369	0.52	0.52	5,410	5,384
	S. Sask. River	11 - 14	11,371	0.55	0.52	6,211	5,930
	Total	**1 - 14**	**66,391**	**0.54**	**0.54**	**35,531**	**35,712**
Prairie (Farmland)	Souris River	15, 16	12,066	0.89	0.91	10,790	10,932
	Corning	17	5,529	0.81	0.83	4,491	4,565
	Regina	18, RMZ	12,590	0.59	0.60	7,415	7,537
	Old Wives	19	9,342	0.64	0.56	6,001	5,250
	Last Mountain	21, 22	13,121	0.36	0.38	4,685	4,990
	Douglas	23, 24	10,632	0.58	0.59	6,147	6,233
	Kindersley	25 - 28	18,070	0.58	0.59	10,447	10,593
	Dundurn	29, 30, SMZ	12,881	0.74	0.78	9,590	10,098
	Total	**15 - 30**	**94,231**	**0.63**	**0.64**	**59,566**	**60,198**
	Prairie Total	**1 - 30**	**160,621**	**0.59**	**0.60**	**95,097**	**95,908**
Parkland	Alida	31, 32	5,296	1.45	1.16	7,693	6,132
	Moosomin	33, 34	9,312	2.45	2.43	22,838	21,714
	QuAppelle R.	35, 36	7,820	0.99	1.46	7,720	11,381
	Melville	37	11,466	1.04	0.98	11,871	11,211
	Touchwood Hills	38, 39	14,242	1.32	1.54	18,762	21,965
	Quill	40, 41	12,687	0.85	1.03	10,771	13,046
	Barrier	42	7,466	1.03	1.25	7,702	9,363
	Carrot R.	43	6,137	1.03	1.25	6,330	7,695
	Redberry	44	3,075	1.00	1.29	3,087	3,958
	Eagle Hills	45	11,236	1.19	1.53	13,321	17,235
	Manitou	46	2,794	1.37	1.49	3,839	4,163
	Turtleford	47	7,927	1.09	1.48	8,668	11,752
	Total	**31-47**	**99,457**	**1.23**	**1.29**	**122,218**	**128,233**
Forest Fringe	Pasquia Fringe	48	5,213	1.03	1.64	5,314	8,517
	Porcupine Fringe	49	4,803	1.11	1.84	5,319	8,848
	Whitefox/FALC	50	4,330	0.98	1.77	4,278	7,718
	Nesbit	51, 52, PMZ	4,275	0.98	1.43	4,175	6,128
	Cookson	53	5,488	1.18	2.14	6,407	11,585
	Thickwood	54	6,108	1.75	2.22	10,718	13,555
	Meadow Lake	55	4,791	1.27	2.36	8,187	11,246
	Total	**48-55**	**35,008**	**1.49**	**2.27**	**44,398**	**67,596**
Forest	Porcupine	56, 57	5,836	1.94	3.04	11,350	14,284
	Pasquia	58, 59	7,013	1.52	1.98	6,514	8,855
	Cumberland	60-62	11,628	0.88	1.06	5,185	6,454
	Candle/Cub	63-65	11,944	0.94	1.00	5,863	3,153
	Dore/Waskesiu	66 (- PANP)	11,322	1.11	1.27	7,758	8,863
	Divide	67	5,982	1.98	3.00	11,830	17,260
	Bronson	68	3,078	2.34	3.03	6,523	8,422
	Waterhen	69 (- PAWR)	7,692	1.21	1.48	8,583	11,317
	Total	**56-69**	**64,495**	**1.00**	**1.29**	**63,588**	**78,609**
Forest	North	70-76	---	No data	No data	No data	No data
Province		**1-69**	**359,581**	**0.93**	**1.06**	**324,985**	**369,263**

PANP = Prince Albert National Park
PAWR = Primrose Air Weapons Range
PMZ = Prince Albert WMZ
RMZ = Regina/Moose Jaw WMZ
SMZ = Saskatoon WMZ

Figure 2 White-tailed deer range and population management units. Note: This range map is incomplete; it requires additional habitat classification in the aspen parkland and grassland ecozones.

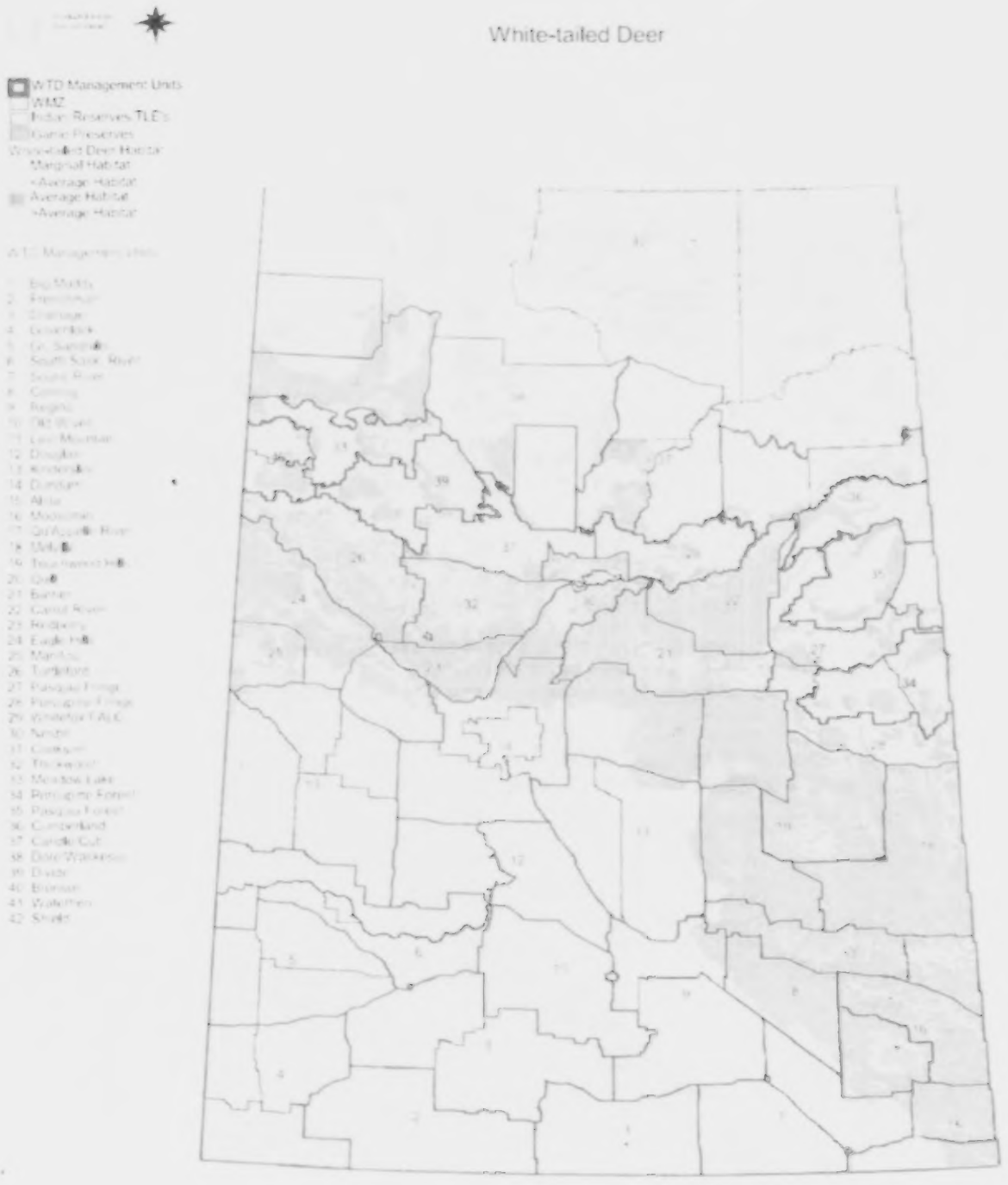

Figure 2. White-tailed deer range and population management units. Note: This range map is incomplete; it requires additional habitat classification in the aspen parkland and grassland ecozones.

Table 2. Summary of white-tailed deer density surveys, 2000/01–2003/04.

ECOREGION/ Survey Block	WMZ	Survey Area (km²)	2000/01 Density (#/km²) ±90% CI [a]	2001/02 Density (#/km²) ±90% CI [a]	2002/03 Density (#/km²) ±90% CI [a]	2003/04 Density (#/km²) ±90% CI [a]
PRAIRIE (Grassland)						
Frenchman-Val Marie	2	1,119	---	---	---	---
Eastend	6	1,370	---	---	---	---
Sask. River (Leader)	11, 14	855	---	---	---	---
Sask. River	13, 14	4,994	---	---	---	---
PRAIRIE (Farmland)						
Corning	17, 33	---	---	---	---	---
Last Mountain Lk	21	2,505	---	---	---	---
Dundurn	29, 30	1,480	---	---	---	---
PARKLAND						
Souris	31	3,149	---	---	---	---
Alida	32	1,492	0.87±17%	---	---	---
Kipling	33	1,494	---	---	---	---
Moose Mountain [b]	33	681	---	---	---	---
Touchwood	33	---	---	---	---	---
Moosomin	34	932	---	---	---	---
Parkman	34	1,865	---	---	---	---
Duck Mountain [b]	37	479	---	---	---	---
Melville	37	5,885	---	---	---	---
Wroxton	37	1,176	---	---	---	---
Parkerview	39	1,678	---	---	---	---
Yorkton	39	3,107	---	---	---	---
Pleasantdale	42	2,949	---	---	---	---
Sonningdale	45	1,958	---	---	---	---
Manitou	46	2,129	---	---	---	---
Manitou	46	3,399	---	1.00±15%	---	---
Marie Hill	46	1,119	---	---	---	---
FOREST FRINGE						
Porcupine Fringe	48	---	---	---	---	---
Fort a la Corne [c]	50	---	---	---	---	---
Thickwood Hills W	54	1,492	---	---	---	---
Forest Fringe	50, 51, 62-64	4,311	---	---	---	---
FOREST						
Porcupine Forest [b]	56	3,318	---	---	---	---
Porcupine Forest DMU	56, 57	5,836	---	---	---	3.04±20.3%
Cumberland S [b]	60	---	---	---	---	---
Bronson [b]	68	3,186	---	---	---	---
Bronson Forest	68S	225	---	---	2.48±?%	---
Divide [b]	67	3,385	---	---	---	---
Divide Forest DMU	67	6,016	---	---	---	3.36±18.7%
Green Lake	67	225	---	---	4.14±?%	---

[a] Confidence intervals on the population density estimate.
[b] Quadrat surveys primarily designed for moose census.
[c] Quadrat surveys designed primarily for elk census.
DMU = White-tailed Deer Management Unit

Table 3. Provincial white-tailed deer population structure based on annual (September to November) CDMS field observations, 1983-2003.

	Grassland			Farmland			Parkland			Forest Fringe			Forest			Province		
Year	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n
1983	0.38	1.07	1,858	0.42	1.07	2,868	0.42	0.95	6,419	0.53	0.91	1,146	0.51	0.82	1,241	0.45	0.99	13,532
1984	0.42	0.94	2,865	0.39	0.94	5,525	0.35	1.04	6,492	0.40	0.99	1,329	0.39	0.85	1,948	0.38	0.97	18,159
1985	0.33	0.78	2,336	0.35	0.87	3,412	0.45	0.82	5,322	0.44	0.83	963	0.46	0.69	1,287	0.40	0.81	13,320
1986	0.33	0.88	5,134	0.33	0.91	6,072	0.44	0.86	11,815	0.42	0.88	2,419	0.45	0.80	3,600	0.40	0.87	29,040
1987	0.37	0.96	3,246	0.39	0.87	4,599	0.38	1.00	9,890	0.41	1.04	2,249	0.43	0.92	3,833	0.39	0.96	23,817
1988	0.38	0.92	2,503	0.46	0.76	5,187	0.44	1.06	10,450	0.39	1.01	2,723	0.42	0.94	3,882	0.43	0.95	24,745
1989	0.42	1.19	1,799	0.43	0.85	4,425	0.40	1.07	12,373	0.36	1.03	3,272	0.42	0.86	4,497	0.41	0.99	26,467
1990	0.42	1.03	2,079	0.41	0.94	4,503	0.47	1.07	8,309	0.39	1.05	2,762	0.43	0.77	3,147	0.43	0.98	20,798
1991	0.37	0.91	2,678	0.40	1.03	4,759	0.37	1.18	10,772	0.33	1.13	3,994	0.42	1.05	4,023	0.38	1.06	26,226
1992	0.45	0.92	3,394	0.42	1.02	8,091	0.47	1.20	10,539	0.40	1.01	1,646	0.44	0.96	2,365	0.44	1.04	26,035
1993	0.41	0.89	2,813	0.46	0.96	6,818	0.44	1.15	11,012	0.50	0.96	2,204	0.49	0.90	2,552	0.45	1.02	25,399
1994	0.34	0.82	2,867	0.48	0.99	5,512	0.45	1.26	10,139	0.36	1.08	2,533	0.45	0.96	2,657	0.43	1.08	23,708
1995	0.26	0.79	3,291	0.47	0.97	6,069	0.48	1.21	8,582	0.39	1.04	2,990	0.35	0.77	1,094	0.42	1.02	22,026
1996	0.29	0.72	2,170	0.45	0.94	3,275	0.44	0.96	6,724	0.56	0.99	1,888	0.44	0.77	1,102	0.43	0.90	15,159
1997	0.29	0.82	1,965	0.44	0.90	2,364	0.45	0.94	4,189	0.50	1.00	1,129	0.76	0.74	367	0.43	0.90	10,014
1998	0.37	0.84	1,989	0.41	0.82	4,182	0.41	1.00	6,083	0.40	1.00	2,756	0.38	1.03	1,824	0.40	0.94	16,834
1999	0.31	0.86	1,979	0.48	0.80	3,712	0.43	0.93	5,667	0.50	0.99	2,276	0.43	0.94	1,730	0.43	0.90	15,364
2000	0.39	0.82	2,780	0.37	0.81	4,153	0.38	1.02	6,520	0.49	0.86	2,066	0.53	0.95	1,482	0.40	0.91	14,041
2001	0.36	0.80	1,711	0.33	0.73	3,044	0.43	0.92	6,131	0.35	1.06	2,971	0.43	1.07	2,067	0.39	0.91	15,924
2002	0.33	0.62	1,356	0.38	0.81	2,491	0.48	0.86	5,305	0.40	0.95	2,410	0.39	0.86	1,030	0.42	0.84	12,592
2003	0.25	0.87	2,302	0.29	0.93	4,030	0.37	0.93	6,821	0.46	1.05	3,871	0.51	0.96	2,380	0.37	0.95	19,428
10-yr Mean	0.32	0.80		0.41	0.87		0.43	1.00		0.44	1.00		0.47	0.91		0.43	0.94	

2.2 Biological Sample Collections

The age structure of harvested animals is presented in Table 4. The mean age of mature bucks (≥4.5years old) was stable in the past, but it is not known if this trend has remained consistent during recent years because of the lack of recent age data. The data indicate that non-resident (guided) hunters typically have harvested proportionately more mature bucks than resident hunters, but this may be an artifact of small sample sizes from resident hunters. Mean age of all bucks also indicates that guided hunters typically select older bucks on average, compared to resident hunters.

Table 4. Age class distribution of white-tailed deer bucks harvested from the forest fringe (WMZs 48, 49, 50, 53 and 55) and forest (WMZs 56-73) ecozones, 1998-2003.

Age Class	1999		2000		2001		2002		2003	
	SR	G	SR	G	SR	G	SR	G	SR	G
1+	14.8 %	1.4 %	28.8 %	1.9 %	11.0%	3.1%				
2+	31.5	19.8	28.8	19.5	21.2	16.1				
3+	11.1	22.4	24.2	31.0	22.0	34.1				
4+	14.8	21.3	4.5	16.2	20.3	23.7				
5+	13.0	20.6	4.5	13.8	4.2	9.2				
6+	3.7	8.8	4.5	11.0	10.2	6.2				
7+	5.6	3.2	1.5	4.5	5.1	4.4				
8+	1.9	1.5	0.0	1.4	5.1	2.3				
9+	1.9	0.5	3.0	0.2	0.0	0.9				
>9+	1.9	0.4	0.0	0.3	0.8	0.1				
Sample Size (n)	54	2,100	66	2,484	118	2,422	na	na	na	na
Mean age of mature (>3.5 yr old) bucks	6.0 n=23	5.5 n=1,184	6.3 n=12	5.7 n=1,182	5.9 n=54	5.6 n=1,133	na	na	na	na
Mean age of bucks (all age classes)	4.0 n=54	4.4 n=2,100	3.1 n=66	4.3 n=2,484	4.2 n=118	4.2 n=2,422	na	na	na	na
Buck Harvest										
F. Fringe (a)	2,366	239	3,234	305	3,433	283	3,475	230	3,615	263
Forest	2,030	2,659	2,242	2,816	2,277	3,027	2,065	2,981	4,742	3,410
Total	4,396	2,898	5,476	3,121	5,710	3,310	5,540	3,211	8,357	3,673
% of bucks harvested that were mature (>3.5 yrs old)	43	56	18	48	46	47	na	na	na	na

SR = Saskatchewan Resident Hunters
G = Non-resident Hunters (Guided)
(a) = SR buck harvest information is for entire area of forest fringe; G buck harvest information refers only to those portions of the forest fringe where outfitting occurs.
na = no data available

2.3 Mortality

2.3.1 License Sales

Table 5. Summary of provincial white-tailed deer license sales, 1980-2003.

Hunt Year	1st Either-sex License				2nd Either-sex License			Antlerless License	Sask. Resident Archery	Sask. Resident Muzzle-loading	Total License Sales
	Sask. Resident	Sask. Youth	Can. Resident	Non-Resident	Sask. Resident	Can. Resident	Non-Resident	Sask. Resident			
1980	64,339	—	974	80	—	—	—	—	1,004	—	66,397
1981	63,543	—	1,316	124	6,757	49	—	—	1,376	—	73,186
1982	57,320	—	1,095	68	6,433	41	21	—	1,590	368	66,915
1983	50,309	—	607	68	4,594	19	0	—	1,411	575	57,586
1984	49,603	—	705	60	4,971	9	6	—	1,543	684	57,583
1985	45,532	—	786	136	—	—	—	419	1,357	577	48,807
1986	48,432	—	491	157	—	—	—	1,512	1,341	587	52,160
1987	41,533	—	438	253	4,453	18	71	339	—	—	47,105
1988	43,023	—	576	532	7,109	39	163	316	—	—	51,758
1989	42,110	—	738	672	8,124	48	187	864	—	—	52,743
1990	40,170	—	692	892	7,231	65	286	2,187	—	—	51,523
1991	40,294	3,712	867	963	9,583	68	323	1,140	—	—	53,238
1992	44,052	4,082	878	1,337	6,731	69	550	14,262	—	—	67,879
1993	41,600	4,249	1,063	2,003	5,900	93	857	21,467	—	—	72,983
1994	43,711	4,302	1,419	2,926	7,031	184	1,328	16,444	—	—	73,043
1995	43,075	4,232	1,424	3,092	6,182	149	1,326	16,252	—	—	71,500
1996	34,207	3,961	1,423	3,034	—	—	—	21,737	—	—	60,401
1997	36,371	3,921	1,827	3,190	—	—	—	21,891	—	—	63,279
1998	41,229	4,410	2,159	3,564	—	—	—	20,686	—	—	67,638
1999	36,981	7,794	2,454	4,083	—	—	—	17,968	—	—	61,486
2000	36,049	7,163	2,199	4,199	—	—	—	4,511	—	—	46,958
2001	34,225	6,704	1,635	4,224	—	—	—	5,531	—	—	45,615
2002	33,370	6,791	2,045	4,478	—	—	—	6,685	—	—	46,578
2003	32,126	6,579	2,234	4,316	4,921	—	—	5,885	—	—	49,482
10-yr (1994-03) Mean	37,134	5,587	1,882	3,711	—	—	—	13,759	—	—	58,598

2.3.2 Hunting Activity and Harvest

There are no data to assess subsistence harvest.

Table 6 summarizes harvest by Saskatchewan resident licensed hunters. Saskatchewan resident hunters have the option to hunt with antlerless and/or either-sex licenses, which allows them to be more selective in what they harvest. The either-sex license results in higher hunting pressure on the buck component of the population. The effects of this are offset with antlerless licenses, which balances the harvest structure. This should facilitate a balanced sex ratio.

There are no data to assess harvest and hunting activities by Canadian resident hunters.

Table 7 summarizes harvest and hunting activities by guided hunters. Guided hunting occurs primarily in the forest WMZs and portions of the forest fringe WMZs. Outfitter clients hunt on an either-sex license, but the harvest is almost exclusively of bucks. Non-residents consistently harvest a lower proportion of yearling bucks and a larger proportion of teenage (2.5 and 3.5 age classes) and mature bucks (≥4.5 year class) than resident hunters (Table 4).

Table 6. Provincial resident white-tailed deer harvest 2003 compared to previous year and 10-yr (1994-2003) mean, license types pooled, (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest statistics by season and WMZ).

Ecozone/ WMZs	Hunt Year	# WMZ Hunters	Harvest					Hunter-days	Hunter-days/ Animal
			Bucks	Does	Fawns	Unkn	Total		
Grassland	2002	4,719	2,189	410	23	0	2,627	16,008	6.08
1 – 14	2003	3,027	1,575	234	31	0	1,840	9,470	5.15
	Mean (1994-03)	6,145	2,480	1,118	281	5	3,885	16,725	4.31
Farmland	2002	15,122	5,860	1,572	375	28	7,835	63,224	8.07
15 – 30	2003	11,913	4,733	1,298	273	0	6,304	58,104	9.22
	Mean (1994-03)	17,649	6,399	2,919	826	20	10,163	65,990	6.49
Parkland	2002	17,023	8,640	1,174	257	35	10,106	72,937	7.22
31 - 47	2003	14,921	7,691	1,063	216	0	8,970	69,443	7.74
	Mean (1994-03)	23,484	9,633	4,089	1,447	28	15,197	95,311	6.27
Forest Fringe	2002	10,367	3,475	1,931	526	41	5,973	50,846	8.51
48 - 55	2003	9,578	3,615	1,928	437	59	6,039	49,327	8.17
	Mean (1994-03)	9,237	3,353	1,760	546	25	5,684	43,668	7.68
Forest	2002	7,556	2,065	1,871	338	29	4,213	30,500	7.24
56 - 69	2003	11,186	4,734	2,227	487	6	7,454	47,228	6.34
	Mean (1994-03)	8,224	2,546	1,320	294	10	4,170	34,514	8.28
Northern Forest	2002	49	0	7	0	0	7	355	50.71
70 - 76	2003	47	0	0	0	0	0	198	---
	Mean (1994-03)	46	8	3	0	0	11	189	17.98
Total	2002	54,836	22,229	6,875	1,524	133	30,761	233,870	7.60
1 – 76	2003	50,672	22,348	6,750	1,444	65	30,607	233,770	7.64
	Mean (1994-03)	64,786	24,419	11,209	3,393	88	39108	256,397	6.56

Table 7. Non-resident (guided) white-tailed deer harvest, 2003 compared to previous year and 10-yr (1994–2003) mean (based on outfitter client reports).

Ecozone/ WMZs	Hunt Year	# WMZ Hunters	Harvest					Hunter-days	Hunter-days/ Animal
			Bucks	Does	Fawns	Unkn	Total		
Forest Fringe	2002	323	230	1	0	0	231	1,397	6.05
48 - 55	2003	316	263	0	0	0	263	1,199	4.56
	Mean (1994-03)	310	224	0	0	3	227	1,358	5.98
Forest	2002	4,037	2,920	1	0	13	2,934	16,939	5.77
56 - 69	2003	3,920	3,345	0	0	0	3,345	13,639	4.08
	Mean (1994-03)	3,616	2,587	2	0	60	2,650	15,104	5.70
Northern Forest	2002	118	61	0	0	0	61	564	9.25
70 - 76	2003	78	65	0	0	0	65	299	4.60
	Mean (1994-03)	56	36	0	0	1	37	279	7.57
Total	2002	4,478	3,211	2	0	13	3,226	18,900	5.86
48 - 76	2003	4,314	3,673	0	0	0	3,673	15,137	4.12
	Mean (1994-03)	3,984	2,846	2	0	64	2,913	16,741	5.75

2.3.3 Depredation Hunts

In-season depredation licenses are offered to landowners to address local and/or chronic depredation concerns.

Table 8. White-tailed deer depredation licenses issued, 1992-2003.

Hunt Year	Licenses Issued	WMZs Issued	Harvest	Success (%)
1992	1,554	WMZs 24, 29, 31, 32, 33, 35, 44, 45, 54	932	60
1993	600	WMZs 1, 15, 31 - 35	390	65
1994	342	Issued in 11 WMZs in the southeast	253	74
1995	1,645	1,445 issued in 11 WMZs in the Southeast 200 issued in WMZ 54	1,234	75
1996	681	Issued in 11 WMZs in the Southeast	456	67
1997	771	WMZs 31, 32 and 37	632	82
1998	530	14,15,31,32,37	450	85
1999	321	WMZs 31, 32, 37	276	86
	55	WMZ 14W	NA	NA
	361	WMZs 7, 10, 11, 14W, 37	NA	NA
	187	WMZs 15, 16, 18, 37	NA	NA
	367	WMZs 15, 16, 18, 31, 32	NA	NA

NA = not available

2.3.4 Impact of Winter Severity

Winter severity for deer is assessed based on snow depth, the number and severity of crop depredation sites, reports of deer concentrations, reports of winter mortality, and the impact of the winter on subsequent spring fawn production. White-tailed deer are impacted when snow depths in sheltered locations exceeds 45 cm. Appendix 2 summarizes annual winter severity for 1981 to present.

2.3.5 Chronic Wasting Disease (CWD)

Table 9. CWD sample collection results for white-tailed deer, 1997-2003.

	Usable Samples				Confirmed CWD Positives			
Year	Male	Female	Unkn	Total	Sex	Age (yrs)	Kill Date	General Location
1997	22	14	36	36				No positives
1998	9	3	6	18				No positives
1999	35	21	2	58				No positives
2000	569	152	5	726				No positives
2001	1,503	768	24	2,295				No positives
2002	1,796	649	0	2,445	M	2+	13 Nov 2002	WMZ 68S
2003	1,563	577	0	2,140	F	4+	14 Feb 2003	WMZ 13E

3.0 Management Strategies

3.1 Southern (WMZs 1-55)

- Continue use of antlerless licenses to stabilize or reduce deer densities in WMZs where surplus deer exist (based on landowner and public concerns).
- Canadian resident hunters were allowed to hunt province-wide using an either-sex license, but the season remained limited to one week in WMZs 1-54 due to concerns regarding concentrations of Canadian resident hunters in zones adjacent to the Manitoba and Alberta borders.
- Cypress Hills West Block (WMZ 7) white-tailed deer season is closed, to curtail the incidence of party hunting for elk by white-tailed deer hunters who were accompanying draw elk hunters.
- The either-sex season was reduced from 5 to 3 weeks in the southern half of WMZ 54 and West half of WMZ 42 to better distribute hunters
- An antlerless season was opened in the WMZ 53, the north half of WMZ 54, and Regina-Moose Jaw WMZ.

3.2 Northern (WMZs 56-76)

- A series of mild winters resulted in a population increase of deer in the forest. A second either-sex license in the forest ecozone (WMZs 56 - 76) was available to resident hunters for 2003 to take advantage of higher than normal deer populations. The antlerless season was maintained to provide a more balanced sex ratio in the total harvest. This allocation strategy will continue for 2004.
- The either-sex deer season overlap with moose was retained in WMZs 70-76.
- Resident hunters possessing a draw moose or elk license were allowed to hunt white-tailed deer during their respective season dates during the 2002 and 2003 hunting seasons, but only in the zone in which they held their draw license(s).
- Regular elk and moose hunters (Sask. residents) were able to hunt white-tailed deer at the same time in WMZs 56 - 76 during the 2002 and 2003 hunting seasons.
- In 2002, the season length for Canadian resident hunters was increased to 4 weeks, and was retained for 2003 and 2004.
- An antlerless season was opened in 2001 in WMZs 48, 49, and 55 to take advantage of increasing populations in those forest fringe zones. The antlerless season was continued in southern forest zones.
- Non-resident deer licenses were modified to include a Head or Antler Export Seal. The seal makes it easier for non-resident hunters to export trophies out of the province.

4.0 Appendix 1. White-tailed deer population structure (based on CDMS) by WMZ, 2002 and 2003. (Note: population structure ratios not calculated for WMZs where sample size is <100).

Ecozone and WMZ	Bucks/Doe		Fawns/Doe		Sample Size	
	2002	2003	2002	2003	2002	2003
Grassland						
1	0.27	0.20	0.29	0.32	120	160
2	0.24	0.32	0.42	0.95	253	622
3	---	---	---	---	11	18
4	0.30	0.29	0.75	0.84	183	320
5	0.46	0.22	0.65	1.04	287	382
6	0.49	0.18	0.73	0.86	113	169
7	---	0.28	---	0.89	65	178
8	---	---	---	---	27	46
9	---	---	---	---	29	40
10	---	---	---	---	24	58
11	---	---	---	---	18	25
12	---	---	---	---	8	11
13	0.25	0.17	0.79	0.98	196	213
14	---	---	---	---	22	60
Total	**0.33**	**0.25**	**0.62**	**0.87**	**1,356**	**2,302**
Farmland						
15	0.53	0.46	0.93	0.74	182	178
16	---	0.40	---	1.07	86	318
17	0.47	0.31	0.74	1.03	197	384
18	---	0.34	---	0.68	72	166
19	0.35	0.28	0.58	0.78	170	177
20 (RMZ)	0.42	0.25	0.95	1.26	227	449
21	0.32	0.24	1.05	0.89	639	1,000
22	0.25	0.06	0.83	1.02	135	110
23	0.29	0.25	0.57	1.04	108	174
24	---	0.26	---	0.73	29	131
25	0.44	0.28	0.36	0.64	156	102
26	0.27	---	0.58	---	102	33
27	---	---	---	---	42	35
28	---	---	---	---	16	15
29	0.53	0.28	0.94	1.03	116	285
30 + SMZ	0.36	0.35	0.75	0.87	214	497
Total	**0.38**	**0.29**	**0.81**	**0.93**	**2,491**	**4,030**
Parkland						
31	0.40	0.46	1.64	1.41	161	106
32	0.36	0.31	1.60	0.87	148	113
33	0.58	0.39	0.74	0.88	153	173
34	0.29	0.32	0.49	0.94	155	176
35	0.45	0.24	0.71	0.88	411	227
36	0.41	0.23	0.77	0.57	351	637
37	0.32	0.29	0.97	1.13	1,090	1,588
38	0.48	0.61	0.73	1.05	236	276
39	0.57	0.45	1.18	0.98	448	863
40	0.42	0.32	0.66	0.96	369	591
41	0.65	0.50	0.73	0.85	682	692
42	0.50	0.31	1.02	0.75	156	289
43	0.43	0.42	0.90	0.94	135	208
44	0.53	0.72	0.51	0.57	159	108
45	0.43	0.34	0.95	1.08	348	530
46	---	---	---	---	6	2
47	1.02	0.69	0.78	0.69	297	242
Total	**0.48**	**0.37**	**0.86**	**0.93**	**5,305**	**6,821**

Appendix 1 (Continued)

Ecozone and WMZ	Bucks/Doe		Fawns/Doe		Sample Size	
	2002	2003	2002	2003	2002	2003
Forest Fringe						
48	0.42	0.48	0.72	1.00	384	572
49	0.21	0.32	0.91	1.14	319	460
50	0.36	0.39	0.83	0.92	289	472
51 + PMZ	0.67	0.67	1.04	1.00	138	195
52	---	0.60	---	0.71	30	111
53	---	0.60	---	0.75	56	129
54	0.36	0.47	1.22	1.16	418	457
55	0.46	0.46	0.99	1.12	776	1,475
Total	**0.40**	**0.46**	**0.95**	**1.05**	**2,410**	**3,871**
Forest						
56	0.30	0.50	1.10	1.03	281	541
57	---	---	---	---	45	63
58	---	---	---	---	0	5
59	---	0.44	---	0.77	86	155
60	---	---	---	---	37	43
61	---	---	---	---	6	2
62	---	---	---	---	3	0
63	---	0.41	---	0.82	61	109
64	---	---	---	---	46	76
65	---	---	---	---	0	11
66	---	0.34	---	0.73	80	188
67	0.24	0.70	0.82	1.04	259	692
68	---	0.33	---	1.04	82	116
69	---	0.48	---	1.16	44	371
70	---	---	---	---	0	0
71	---	---	---	---	0	0
72	---	---	---	---	0	0
73	---	---	---	---	0	8
Total	**0.39**	**0.51**	**0.86**	**0.96**	**1,030**	**2,380**
Province	**0.42**	**0.37**	**0.84**	**0.95**	**12,592**	**19,428**

RMZ = Regina/Moose Jaw Wildlife Management Zone
SMZ = Saskatoon Wildlife Management Zone
PMZ = Prince Albert Wildlife Management Zone

Appendix 2. Assessment of winter severity on white-tailed deer populations.

Winter	Assessment
1981/82	**Average** winter conditions except in central and southeast portions of Sask., which received above average snowfall, cold temperatures and significant winter deer mortality
1982/83	**Mild** with below average snowfall
1983/84	**Mild** with below average snowfall
1984/85	**Very severe** with significant winter mortality province wide
1985/86	**Mild** with below average snowfall
1986/87	**Mild** with below average snowfall
1987/88	**Mild** with below average snowfall
1988/89	**Average** winter conditions
1989/90	**Mild** with below average snowfall
1990/91	**Mild** with below average snowfall
1991/92	**Mild** with below average snowfall
1992/93	**Average** winter conditions
1993/94	**Average** winter conditions
1994/95	**Mild** winter, but late winter snowfall in east forest fringe and east parkland zones as well as protracted spring resulted in poor deer condition, but a normal level winter mortality.
1995/96	**Severe** winter conditions resulting in reduced fawn production in central and southeast (especially WMZs 33 and 34) Sask.
1996/97	**Severe** winter conditions similar to previous year
1997/98	**Mild** with below average snowfall
1998/99	**Mild** with below average snowfall, except for portions of south-central and extreme southeast Sask.
1999/00	**Mild** with below average snowfall
2000/01	**Mild** winter with below average snowfall, except in the southeast (WMZs 15-17, 31-37) where snowpack (≥45 cm) conditions were similar to the 1984/85 winter, and significant winter deer mortality occurred
2001/02	**Mild** with below average snowfall
2002/03	**Mild** with below average snowfall
2003/04	**Mild** with below average snowfall, except for WMZs 1-14 where early heavy snowfall caused moderate mortality

Mule Deer *(Odecoileus hemionus)*

1.0 Long-term Management Objectives

A formal long-term strategic management plan has not been developed for mule deer. The following interim objectives will be used until such time as a long-term plan is available.

- Maintain a stable winter population of 43,000 mule deer
- Maintain a provincial autumn population structure ≥50 bucks:100 does:85 fawns (measured by CDMS).
- Retain 10,000 km² of critical mule deer habitat as described by the Terrestrial Wildlife Habitat Inventory. Area specific long-term mule deer range objectives have not yet been established.
- Long-term harvest objectives have not been formally established.

2.0 Population Status

Mule deer population status is determined annually from a combination of data acquired from aerial population density and structure surveys, annual pre-season wildlife observations (Co-operative Deer Management Survey (CDMS)), weather severity measurements, habitat condition evaluations, biological collections, deer necropsies, and field reports from the general public, landowners and SE staff. Deviations from the established norm are examined to assess whether populations are changing because of management strategies or other environmental factors.

A population status assessment model (see Methods, section 1.2) was used to calculate population sizes in individual Mule Deer Management Units (MDMUs). The sums of the MDMU estimates were used to calculate an annual total winter population estimate (Figure 1). Figure 2 illustrates the

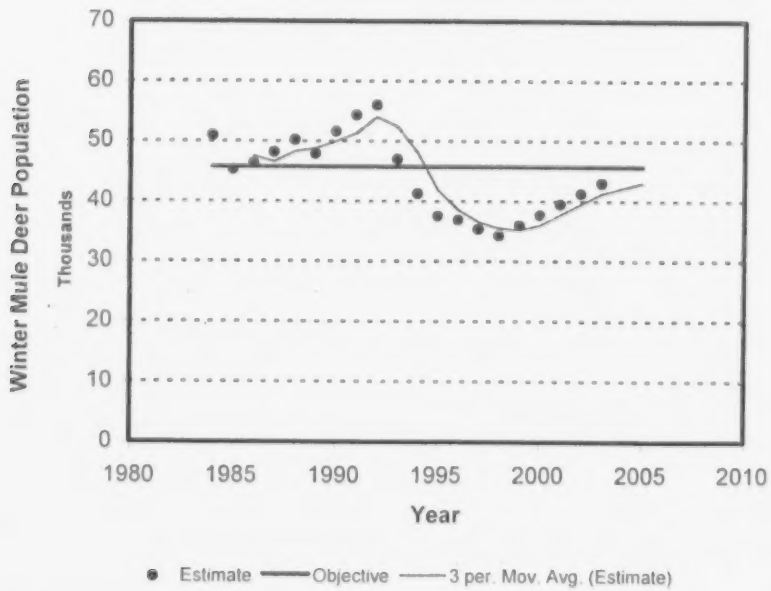

Figure 1. Estimated provincial winter mule deer population in relation to long-term objective.

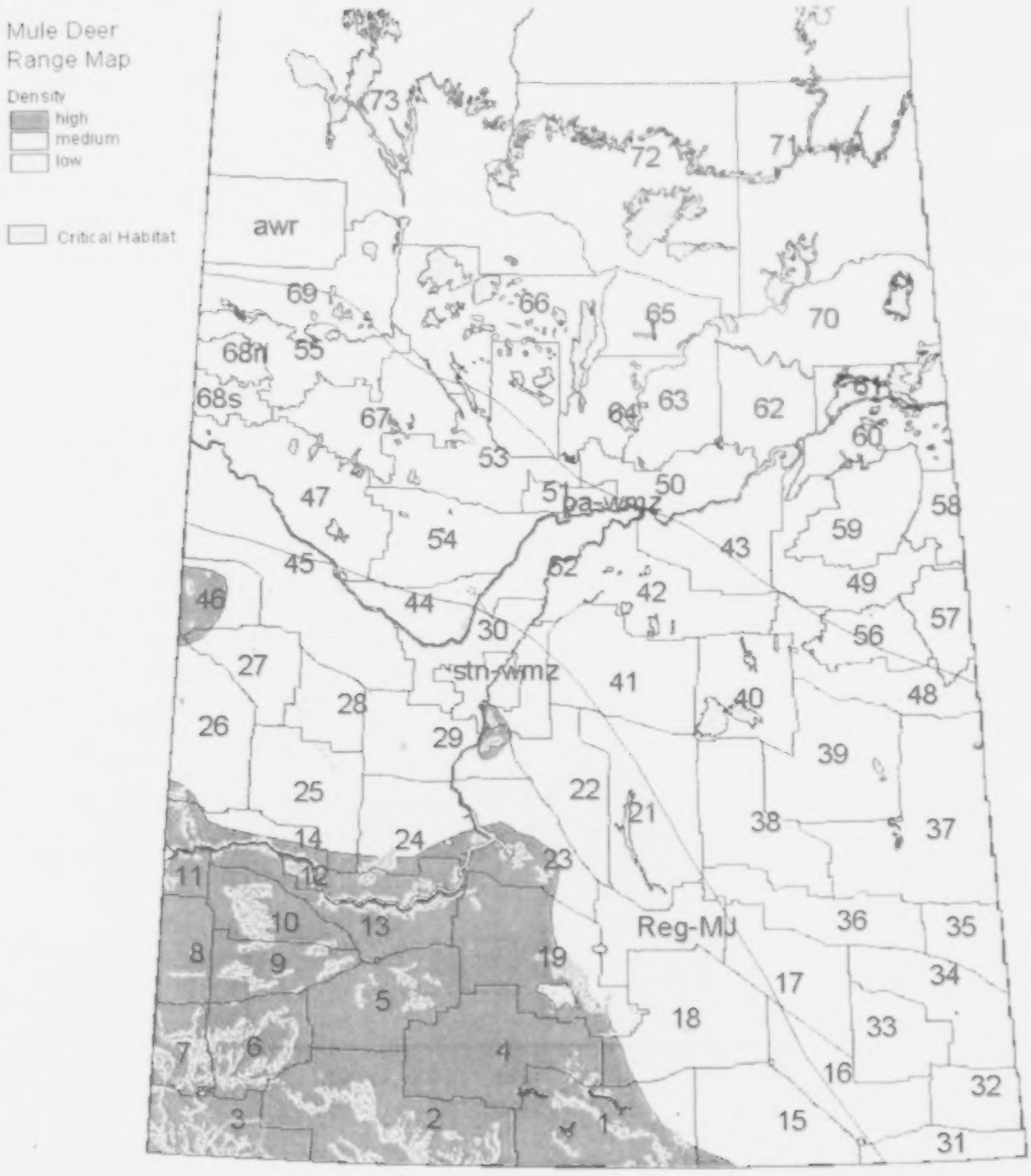

Figure 2. Mule deer range and population management units.

MDMUs. The 2003 winter provincial mule deer population was estimated to be 43,028 animals, which is near the long-term (1984 – 2003) mean winter population size of 43,904.

2.1 Survey Data

Figure 2 illustrates mule deer range. Table 1 summarizes current population density and size in relation to long-term (1984-2003) means based on interpolation from limited survey data. These estimates are subject to change as new data are incorporated into the mule deer population status assessment model. Greatest confidence is in the model estimates for the Great Sandhills, S. Sask. River, and Manitou Sandhills MDMUs.

Table 1. Summary of status by ecozone and management unit.

Ecozone	Mule Deer Management Unit (MDMU)	WMZ	Area (km²)	Winter MDMU Density Estimate (#/km²)		Winter Population Estimate	
				Mean (1984 – 03)	2003/04	Mean (1984 – 03)	2003/04
Prairie (Grassland)	Big Muddy	1	8,251	0.18	0.15	1,528	1,492
	Frenchman	2	10,657	0.31	0.26	3,403	3,315
	Govenlock	3	4,615	0.33	0.28	1,532	1,492
	Drainage	4, 5	14,136	0.11	0.10	1,509	1,470
	Cypress	6, 7	6,993	0.47	0.43	3,315	3,231
	G. Sandhills	8 - 10	10,369	0.80	0.75	8,456	8,406
	S. Sask. R.	11 - 14	11,371	0.80	0.61	9,260	8,849
	Total	**1 - 14**	**66,391**	**0.48**	**0.37**	**29,004**	**28,255**
Prairie (Farmland)	Brokenshell	15, 18	15,140	0.04	0.02	605	626
	Chapleau	16, 17	10,839	0.01	<0.01	94	96
	Dirt Hills	19	9,342	0.19	0.12	1,864	1,926
	Last Mtn. Lk.	RMZ, 21, 22	17,327	0.07	0.06	1,173	1,185
	Douglas	23, 24	10,632	0.19	0.17	1,969	1,853
	Kindersley	25 - 28	18,070	0.13	0.13	2,392	2,260
	Dundurn	29, 30, SMZ	10,916	0.09	0.09	1,010	950
	Total	**15 – 30**	**92,265**	**0.10**	**0.08**	**9,106**	**8,896**
Parkland	Oxbow	31, 32	5,296	<0.01	<0.01	44	44
	Moose Mtn.	33, 34	9,312	0.01	0.01	111	109
	QuAppelle R.	35, 36	7,820	0.01	0.01	111	109
	Duck Mtn.	37	11,466	<0.01	<0.01	44	44
	Quill Lk.	38 - 40	19,627	0.02	0.01	355	349
	Lenore	41, 42	14,768	0.03	0.02	443	435
	Carrot R.	43	6,137	0.01	0.01	89	87
	N. Sask. R.	44, 45, 47	22,237	0.05	0.05	1,187	1,153
	Manitou	46	2,794	1.00	1.05	2,791	2,940
	Total	**31 - 47**	**99,457**	**0.05**	**0.05**	**5,175**	**5,267**
Forest Fringe	Porcupine	48, 49	10,017	<0.01	<0.01	66	66
	FALC	50	4,330	<0.01	<0.01	22	22
	MacDowall	51, 52, PMZ	4,275	0.01	0.01	44	44
	Shellbrooke	53	5,488	<0.01	<0.01	44	44
	Thickwood	54	6,108	0.04	0.03	221	218
	Meadow Lk.	55	4,791	0.04	0.04	221	218
	Total	**48 - 55**	**35,008**	**0.02**	**0.01**	**620**	**609**
Province		**1 - 55**	**293,121**	**0.16**	**0.13**	**43,904**	**43,028**

RMZ = Regina/Moose Jaw Wildlife Management Zone
SMZ = Saskatoon Wildlife Management Zone
PMZ = Prince Albert Wildlife Management Zone

Recent population density surveys are summarized in Table 2. A summary of autumn (Sep – Nov) population structure by ecozone is presented in Table 3, and by Wildlife Management Zone in Appendix 1.

Table 2. Summary of mule deer density surveys, 1998/99–2003/04.

ECOREGION/ Survey Block	WMZ	Survey Area (km²)	1998/99 Density (#/km² ±95%CI)	1999/00 Density (#/km² ±95%CI)	2000/01 Density (#/km² ±95%CI)	2001/02 Density (#/km² ±95%CI)	2002/03 Density (#/km² ±95%CI)	2003/04 Density (#/km² ±90%CI)
GRASSLAND								
Frenchman	2	2,489	–	–	–	–	–	–
Eastend	6	817	–	–	–	–	–	–
Great Sandhills	9	436	2.92±52%	–	–	–	–	1.92±25%
Great Sandhills	10	896	4.06±19%	–	–	–	–	6.14±17%
Burstall	11	83	11.07±71%	–	–	–	–	6.53±42%
Cabri	12	185	3.12±56%	–	–	–	–	3.67±41%
Stewart Valley	13	114	–	–	–	–	–	–
Matador-Beechy	14	148	–	–	–	–	–	–
S. Sask. River	13, 14	2,888	1.05±33%	–	–	–	–	–
FARMLAND								
Douglas Park	23	?	4.86±7%	–	–	–	–	3.05±7%
Couteau Pasture	24	?	7.32±7%	–	–	–	–	–
Progress WMU	26	122	–	–	–	–	–	–
Mariposa WMU	27	137	–	–	–	–	–	–
Harris	29	222	–	–	–	–	–	–
PARKLAND								
Manitou	46	414	–	–	–	–	–	–
Manitou	46	2,696	–	–	–	1.09±18%	–	–
Manitou HRA	46	995	–	–	–	1.75±18%	–	–
Paradise Hill / HPA2	47	225	–	–	–	0.03±7%	–	–

HPA = High Priority Area
HRA = Herd Reduction Area

2.2 Biological Sample Collections

There were no biological collections for mule deer other than those submitted for Chronic Wasting Disease testing (see section 2.3.5).

Table 3. Provincial mule deer population structure based on annual (September to November) CDMS field observations, 1984-2003.

	Grassland			Farmland			Parkland			Forest Fringe			Forest			Province		
Year	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n	Bucks /Doe	Fawns /Doe	n
1984	0.44	0.80	3,581	0.44	0.84	1,365	0.33	0.59	91	---	---	20	---	---	19	0.44	0.80	5,076
1985	0.40	0.82	3,753	0.41	0.71	1,331	0.33	0.54	176	---	---	19	---	---	10	0.40	0.78	5,289
1986	0.41	0.79	6,487	0.34	0.70	2,807	0.36	0.76	585	---	---	37	---	---	69	0.38	0.76	10,035
1987	0.47	0.90	3,839	0.37	0.62	2,163	0.31	0.71	373	---	---	31	---	---	86	0.42	0.78	6,492
1988	0.57	0.89	4,371	0.44	0.69	2,764	0.37	0.84	728	---	---	44	---	---	44	0.50	0.80	7,951
1989	0.46	0.92	3,096	0.42	0.86	2,173	0.42	0.79	671	---	---	56	---	---	33	0.44	0.88	6,029
1990	0.56	0.97	3,945	0.48	0.94	3,707	0.33	0.67	994	---	---	30	---	---	17	0.49	0.91	8,693
1991	0.55	0.88	5,032	0.48	0.82	2,894	0.66	0.85	750	---	---	44	---	---	25	0.53	0.85	8,745
1992	0.55	0.95	4,608	0.52	0.89	4,951	0.54	0.94	930	---	---	15	---	---	6	0.53	0.92	10,518
1993	0.54	0.73	3,566	0.50	0.77	3,826	0.43	0.81	906	---	---	25	---	---	---	0.51	0.76	8,323
1994	0.47	0.69	3,141	0.62	0.76	2,855	0.43	1.06	579	---	---	96	---	---	17	0.52	0.75	6,688
1995	0.38	0.64	2,728	0.54	0.89	2,857	0.27	0.80	669	0.36	1.10	244	---	---	19	0.43	0.78	6,517
1996	0.46	0.61	1,765	0.49	0.81	2,810	0.35	0.77	1,103	---	---	22	---	---	---	0.45	0.73	5,700
1997	0.47	0.76	1,438	0.44	0.68	1,988	0.43	1.32	546	---	---	5	---	---	2	0.45	0.78	3,979
1998	0.52	0.75	2,129	0.49	0.74	3,428	0.48	0.88	738	---	---	89	---	---	33	0.50	0.76	6,417
1999	0.55	0.79	3,425	0.44	0.74	3,329	0.39	0.77	812	0.32	1.18	142	---	---	28	0.48	0.77	7,736
2000	0.53	0.77	4,640	0.39	0.69	5,266	0.34	0.78	981	0.57	1.11	142	---	---	37	0.44	0.74	11,066
2001	0.57	0.71	3,603	0.57	0.65	3,278	0.48	0.77	994	0.36	1.19	225	---	---	14	0.55	0.71	8,114
2002	0.67	0.75	2,905	0.45	0.67	3,837	0.47	0.58	866	0.52	0.87	160	---	---	4	0.53	0.69	7,772
2003	0.50	0.78	4,364	0.53	0.99	4,548	0.43	0.81	859	0.56	0.80	130	---	---	17	0.51	0.87	9,976
10-yr Mean	0.51	0.73		0.50	0.76		0.41	0.85		0.45	1.04		---	---		0.49	0.76	

Note: Population structure ratios not calculated where n < 100.

2.3 Mortality

2.3.1 License Sales

Table 4. Summary of provincial mule deer license sales, 1980-2003.

Hunt Year	Draw Either-sex License	Draw Antlerless License	Sask. Resident Archery	Sask. Resident Muzzle-loading	Total License Sales
1980	4,100	—	245	—	4,345
1981	4,329	—	351	—	4,680
1982	5,471	—	600	—	6,071
1983	5,754	1,455	775	—	7,984
1984	5,754	6,331	804	—	12,889
1985	6,561	9,069	969	—	16,599
1986	6,860	4,046	1,015	275	12,196
1987	6,857	2,219	841	146	10,063
1988	6,171	2,297	902	253	9,623
1989	6,446	3,615	1,009	379	11,449
1990	6,589	6,439	1,078	479	14,585
1991	7,087	10,731	964	557	19,339
1992	7,007	12,802	1,099	653	21,561
1993	6,983	12,857	1,055	—	20,895
1994	6,248	7,118	1,009	—	14,375
1995	5,966	2,014	889	—	8,869
1996	6,105	1,864	846	—	8,815
1997	5,719	711	845	—	7,275
1998	3,841	252	1,107	—	5,200
1999	3,650	431	984	—	5,065
2000	3,716	1,113	1,245	—	6,074
2001	4,061	2,510	1,497	—	8,068
2002	5,890	5,257	1,498	—	12,645
2003	7,235	10,329	1,509	—	19,073
10-yr (1994-03) Mean	5,243	3,160	1,143	—	9,546

2.3.2 Hunting Activity and Harvest

There are no data to assess subsistence harvest. Table 6 summarizes harvest by Saskatchewan resident licensed hunters. Saskatchewan resident hunters have the option to apply for, and hold both an either-sex and/or antlerless license through the draw system. The either-sex license results in higher hunting pressure on bucks, whereas the antlerless license is used to offset the effects of the either-sex license, and to produce a balanced harvest structure.

Table 5. Provincial mule deer harvest, 2003 compared to previous year and10-yr mean (1994-2003), license types pooled, (see Big Game Hunter Harvest Statistics for summaries of hunting activity and harvest by season and WMZ).

Ecozone/ WMZ's	Hunt Year	# WMZ Hunters	Harvest					Hunter-days	Hunter-Days/ Animal
			Bucks	Does	Fawns	Unkn	Total		
Grassland 1 - 14	2002	6,030	2,425	2,036	393	21	4,875	15,773	3.24
	2003 [b]	10,038	3,234	7,853 [b]	1,672 [b]	15	12,774	28,305	2.22
	Mean (1994-03)	4,964	2,074	1,763	409	9	4,254	13,048	3.07
Farmland 15 - 30	2002	5,459	1,544	1,658	378	17	3,597	21,446	5.96
	2003 [b]	8,015	2,040	4,733 [b]	1,446 [b]	35	8,254	28,713	3.48
	Mean (1994-03)	3,642	1,366	1,112	293	10	2,780	13,407	4.82
Parkland 31 - 47	2002	1,794	517	428	144	4	1,093	7,717	7.06
	2003	2,131	595	862	284	0	1,741	9,250	5.31
	Mean (1994-03)	1,222	383	341	103	2	828	4,756	5.74
Forest Fringe 48 - 55	2002	169	58	20	0	0	78	777	9.96
	2003	80	31	12	7	0	50	361	7.22
	Mean (1995-03) [a]	100	32	18	4	1	55	436	7.86
Total 1 - 55	2002	13,452	4,544	4,142	915	42	9,643	45,713	4.74
	2003 [b]	20,264	5,900	13,460 [b]	3,409 [b]	50	22,819	66,629	2.92
	Mean (1994-03)	9,918	3,851	3,232	809	21	7,913	31,603	3.99

[a] There were no hunting opportunities in the forest fringe ecozone prior to 1995.

[b] 2003 was the first year the antlerless bag limit was increased to 2 deer (see Appendix 2), resulting in increased harvest of does and fawns.

2.3.3 Depredation Hunts.

No data available.

2.3.4 Impact of Winter Severity

The winter of 2002/03 was another of several recent mild winters in southwestern Saskatchewan, which have allowed mule deer populations to rebound and grow following the high harvests of the early 1990s. The winter of 2003/04 likely had a mild negative impact on mule deer population growth in some of the southwest grassland populations, particularly south of the trans-Canada highway.

2.3.5 Chronic Wasting Disease (CWD)

Refer to Williams et al. 2002 for a review of CWD in North America. The first confirmed case of CWD in Saskatchewan was diagnosed from a game farmed elk in 1996. SE began testing wild deer and elk in 1997. The first case of CWD in wild mule deer was detected in 2000. Table 6 summarizes the results of efforts used in Saskatchewan to detect and or eradicate CWD in wild mule deer. The increasing number of positive CWD cases reported annually in Table 6 is due to increased and focused annual sampling effort to detect distribution and level of prevalence of CWD. It does not infer

a rapid spread of the disease. Hence, the expanding boundaries of the herd reduction areas (particularly Saskatchewan Landing Provincial Park) are because of efforts to determine how widespread and prevalent CWD is from locations of known positives.

Table 6. CWD sample collection results for mule deer, 1997-2003.

	Usable Samples				Confirmed CWD Positives			
Year	Male	Female	Unkn	Total	Sex	Age (yrs)	Kill Date	General Location
1997	2	0	0	2	---------- No Positives ----------			
1998	40	20	31	91	---------- No Positives ----------			
1999	59	21	1	81	---------- No Positives ----------			
2000	106	78	1	185	M	2+	20 Nov 2000	WMZ 46
2001	653	578	1	1,232	M	4+	1 May 2001	WMZ 46
2002	1,003	2,076	2	3,081	M	2+	? May 2002	WMZ 46
					M	2+	28 Sep 2002	WMZ 14E
					M	2+	3 Oct 2002	WMZ 13E
					F	3+	11 Nov 2002	WMZ 13E
					M	2+	9 Nov 2002	WMZ 13E
2003	945	1,974	0	2,919	M	2+	22 Feb 2003	WMZ 13E
					M	1+	20 Feb 2003	WMZ 13E
					M	2+	4 Mar 2003	WMZ 13E
					M	2+	3 Oct 2003	WMZ 14E
					M	2+	23 Sep 2003	WMZ 14E
					F	1+	11 Nov 2003	WMZ 13E
					F	1+	30 Sep 2003	WMZ 47
					F	3+	4 Nov 2003	WMZ 13E
					M	3+	7 Oct 2003	WMZ 14E
					M	2+	3 Nov 2003	WMZ 14E
					F	2+	7 Nov 2003	WMZ 13E
					F	3+	17 Nov 2003	WMZ 13E
					M	4+	8 Nov 2003	WMZ 13E
					M	2+	5 Nov 2003	WMZ 13E
					M	4+	3 Nov 2003	WMZ 14E
					M	2+	12 Nov 2003	WMZ 14E
					F	4+	11 Nov 2003	WMZ 13E
					M	2+	4 Nov 2003	WMZ 14E
					F	2+	3 Dec 2003	WMZ 14E
					M	4+	4 Nov 2003	WMZ 13E
					F	5+	6 Dec 2003	WMZ 13E
					M	2+	31 Dec 2003	WMZ 14E
					M	3+	2 Oct 2003	WMZ 13E
					M	2+	4 Oct 2003	WMZ 13E
					M	2+	30 Dec 2003	WMZ 14E

(a) Includes only processed samples that were useable from across the province; does not include samples that were unusable (because sample autolyzed, was a fawn, or was damaged by gunshot), nor samples that were processed but yielded an inconclusive CWD test result.

3.0 Management Strategies

- Monitor mule deer population densities in various portions of mule deer range as funding and survey priorities permit.
- Monitor mule deer population structure and productivity using the Cooperative Deer Management Survey.
- Continue using a selective harvest strategy by adjusting license quotas (see Appendix 2) to maintain population levels in hunted Mule Deer Management Units near their long-term average population sizes (see Table 1) and structure (see Appendix 1).
- Continue the CWD detection and eradication program. Develop a long-term CWD management strategy.
- Develop a long-term population management strategy for mule deer.

4.0 Appendix 1. Mule deer population structure (based on CDMS) summary by WMZ, 2002 and 2003. (Note: Population structure ratios not calculated where n < 100)

Ecozone and WMZ	Bucks/Doe		Fawns/Doe		Sample Size	
	2002	2003	2002	2003	2002	2003
Grassland						
1	0.28	0.25	0.46	0.64	335	322
2	0.59	0.51	0.60	0.70	429	988
3	---	---	---	---	19	29
4	---	0.57	---	0.66	81	256
5	0.56	0.58	0.94	0.93	582	425
6	2.15	0.75	0.85	0.84	220	305
7	0.57	0.80	0.95	0.85	154	188
8	---	1.02	---	1.11	83	166
9	0.83	---	0.77	---	185	41
10	0.90	0.42	0.98	0.58	236	176
11	---	---	---	---	43	63
12	---	---	---	---	3	10
13	0.72	0.46	0.71	0.80	307	782
14	0.73	0.34	0.75	0.81	228	613
Total	**0.67**	**0.50**	**0.75**	**0.78**	**2,905**	**4,364**
Farmland						
15	0.58	0.75	0.96	0.90	203	127
16	---	0.40	---	0.85	35	106
17	0.38	0.41	0.81	0.78	127	127
18	0.44	0.76	0.69	0.90	330	337
19	0.71	0.46	0.46	0.85	296	351
RMZ	0.46	0.45	0.80	1.23	147	252
21	0.25	0.37	0.77	0.93	218	228
22	0.32	---	1.13	---	130	78
23	0.44	0.72	0.45	1.20	506	590
24	0.36	0.53	0.56	0.84	306	550
25	0.61	0.53	0.41	0.98	319	356
26	0.44	0.61	0.77	0.87	596	317
27	0.44	0.17	0.59	0.59	110	121
28	0.53	0.63	0.48	1.04	125	123
29	0.37	0.47	0.90	1.27	302	714
30 + SMZ	---	0.61	---	0.83	87	171
Total	**0.45**	**0.53**	**0.67**	**0.99**	**3,837**	**4,548**
Parkland						
31	---	---	---	---	0	0
32	---	---	---	---	4	12
33	---	---	---	---	4	2
34	---	---	---	---	4	13
35	---	---	---	---	0	3
36	---	---	---	---	38	58
37	---	---	---	---	0	13
38	---	---	---	---	9	8
39	---	---	---	---	16	30
40	---	---	---	---	11	30
41	0.37	0.35	0.47	0.97	296	241
42	---	---	---	---	27	47
43	---	---	---	---	31	18
44	---	---	---	---	92	92
45	0.52	0.73	0.65	1.16	187	246
46	---	---	---	---	20	16
47	0.77	---	1.19	---	127	88
Total	**0.47**	**0.43**	**0.58**	**0.81**	**866**	**859**

Appendix 1 (Continued)

Ecozone and WMZ	Bucks/Doe 2002	Bucks/Doe 2003	Fawns/Doe 2002	Fawns/Doe 2003	Sample Size 2002	Sample Size 2003
Forest Fringe						
48	---	---	---	---	7	8
49	---	---	---	---	25	13
50	---	---	---	---	0	7
51 + PMZ	---	---	---	---	9	8
52	---	---	---	---	8	11
53	---	---	---	---	6	12
54	---	---	---	---	9	30
55	---	---	---	---	96	41
Total	**0.52**	**0.56**	**0.87**	**0.80**	**150**	**130**
Forest						
56	---	---	---	---	0	2
57	---	---	---	---	0	0
58	---	---	---	---	0	5
59	---	---	---	---	0	0
60	---	---	---	---	4	0
61	---	---	---	---	0	0
62	---	---	---	---	0	0
63	---	---	---	---	0	0
64	---	---	---	---	0	2
65	---	---	---	---	0	0
66	---	---	---	---	0	0
67	---	---	---	---	0	2
68	---	---	---	---	0	1
69	---	---	---	---	0	0
70	---	---	---	---	0	0
71	---	---	---	---	0	0
72	---	---	---	---	0	0
73	---	---	---	---	0	5
Total	---	---	---	---	**4**	**17**
Province	**0.53**	**0.51**	**0.69**	**0.87**	**7,772**	**9,976**

RMZ = Regina/Moose Jaw Wildlife Management Zone
SMZ = Saskatoon Wildlife Management Zone
PMZ = Prince Albert Wildlife Management Zone

Appendix 2. Mule deer license quotas, 1998–2003.

	Either-sex						Antlerless						
WMZ	1998	1999	2000	2001	2002	2003	1998	1999	2000	2001	2002	2003	
1	200	200	200	200	350	350	--	--	--	--	100	100	x2
2	300	300	300	300	--	--	--	--	--	250	--	--	
2 E	--	--	--	--	100	150	--	--	--	--	150	150	x2
2 W	--	--	--	--	300	300	--	--	150	--	750	400	x2
3	100	100	100	100	--	100	--	--	--	--	--	50	x2
4	--	--	50	50	100	100	--	--	--	--	--	--	
5	50	25	25	75	150	200	--	--	--	100	200	200	x2
6	150	150	150	150	200	200	--	--	100	150	300	300	x2
7	50	50	50	50	75	75	--	--	--	--	100	100	x2
8	--	--	--	25	25	50	--	--	--	25	100	100	x2
9	75	75	50	50	100	100	--	--	--	50	100	100	x2
10	200	200	200	250	300	350	--	--	50	200	400	400	x2
11	50	50	50	50	75	75	50	50	100	200	300	300	x2
12	50	40	40	50	50	50	--	--	--	50	75	75	x2
13	100	100	100	--	--	--	--	--	--	--	--	--	
13 E	--	--	--	90	200	600	--	--	--	175	400	500	x2
13 W	--	--	--	60	60	60	--	--	--	75	75	75	x2
14	200	--	--	--	--	--	--	--	--	--	--	--	
14 E	--	100	100	100	200	800	--		50	200	300	500	x2
14 W	--	50	50	75	100	150	--	25	50	100	200	200	x2
15	75	--	--	25	25	50	--	--	--	--	25	25	
16, 17 &33	50	50	25	25	50	75	--	--	--	--	--	--	
18	75	--	--	--	100	100	--	--	--	--	50	100	
19	200	150	200	200	250	250	--	--	--	--	50	150	
RMZ	75	50	50	75	100	100	--	--	--	--	50	100	
21	75	50	50	75	100	100	--	--	25	50	100	100	
22	50	50	50	75	100	100	--	--	25	50	100	100	
23	150	150	150	200	200	400	--	--	50	50	400	250	x2
24	150	150	150	150	200	400	--	--	50	150	400	250	x2
25	100	100	100	100	100	100	--	--	--	--	100	100	x2
26	125	125	125	125	125	125	--	--	--	--	150	150	x2
27	100	100	100	100	100	100	--	--	--	--	100	100	x2
28	50	50	50	50	75	100	--	--	25	50	125	175	x2
29	150	150	150	250	300	--	--	--	100	200	300	--	
29 E	--	--	--	--	--	100	--	--	--	--	--	150	x2
29 W	--	--	--	--	--	200	--	--	--	--	--	250	x2
30	70	70	70	150	200	200	--	--	50	100	200	200	
SWM	35	35	35	50	100	100	--	--	--	50	100	150	
31	25	25	--	--	--	--	--	--	--	--	--	--	
36	25	25	25	25	25	25	--	--	--	--	--	--	
38, 39, 40	--	--	--	100	100	100	--	--	--	--	--	--	
40	50	50	50	--	--	--	--	--	--	--	--	--	
41	50	50	75	75	75	75	--	--	--	--	--	--	
42	25	25	50	50	50	50	--	--	--	--	--	--	
43	--	--	--	--	25	25	--	--	--	--	--	--	
44	50	75	75	75	75	100	--	--	25	50	75	100	
45	200	250	250	100	--	--	--	--	--	100	--	--	
45 E	--	--	--	--	150	150	--	100	100	--	150	150	x2
45 W	--	--	--	--	150	150	--	100	150	--	200	250	x2
46	150	150	150	--	300	300	100	150	200	--	400	400	x2
47	100	150	150	150	200	200	--	--	--	50	100	200	
54	50	50	50	50	50	50	--	--	--	--	--	--	
55	50	50	50	50	50	50	--	--	--	--	--	--	
Total	3,830	3,620	3,695	4,000	5,860	7,585	250	425	1,300	2,475	6,775	7,000 (+5775)	

RMZ = Regina/Moose Jaw Wildlife Management Zone
SMZ = Saskatoon Wildlife Management Zone
x2 = 2 meat seals/license

5.0 Literature Cited

Williams, E.S., M.W. Miller, T.J. Kreeger, R.H. Kahn, and E.T. Thorne. 2002. Chronic wasting disease of deer and elk: a review with recommendations for management. J. Wildl. Manage. 66(3):551 – 563.

Elk *(Cervus elaphus)*

1.0 Long-term Management Objectives

- Maintain stable wintering populations in all Elk Management units (EMUs) to attain a provincial winter population of 14,900 ±10% elk.
- Maintain a winter herd structure >15 bulls/100 cows/40 calves in all EMUs.
- Retain 30,870 km² of occupied primary elk range.
- Provide a sustainable licensed harvest of 2,250 ±10% elk, with total harvest in any EMU not to reduce the EMU population below the winter population objective of that EMU ±10%.

2.0 Population Status

The 2003 winter provincial elk population is estimated to be about 14,782 elk, which is within the long-term population objective of 14,900 ±10% elk (Figure 1, Table 1). A population status assessment model (see Methods, section 1.2) was used to estimate population sizes in individual EMUs (Figure 2). Linear interpolation of survey data was used between survey years for individual EMUs. The sum of the EMU estimates was used to calculate an annual provincial total population estimate (Figure 1).

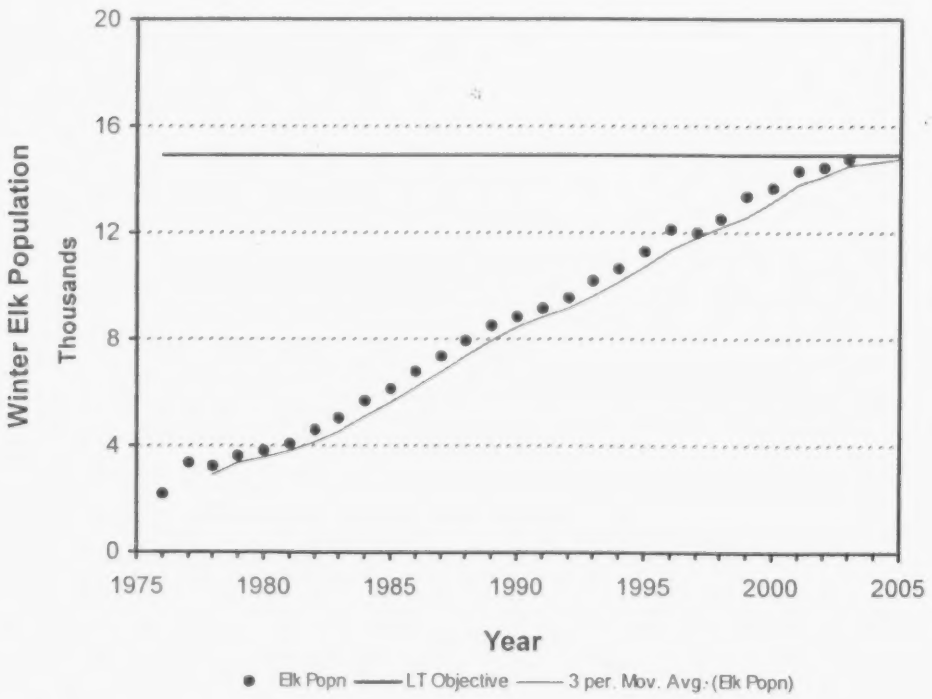

Figure 1. Estimated provincial winter elk population in relation to long-term objective.

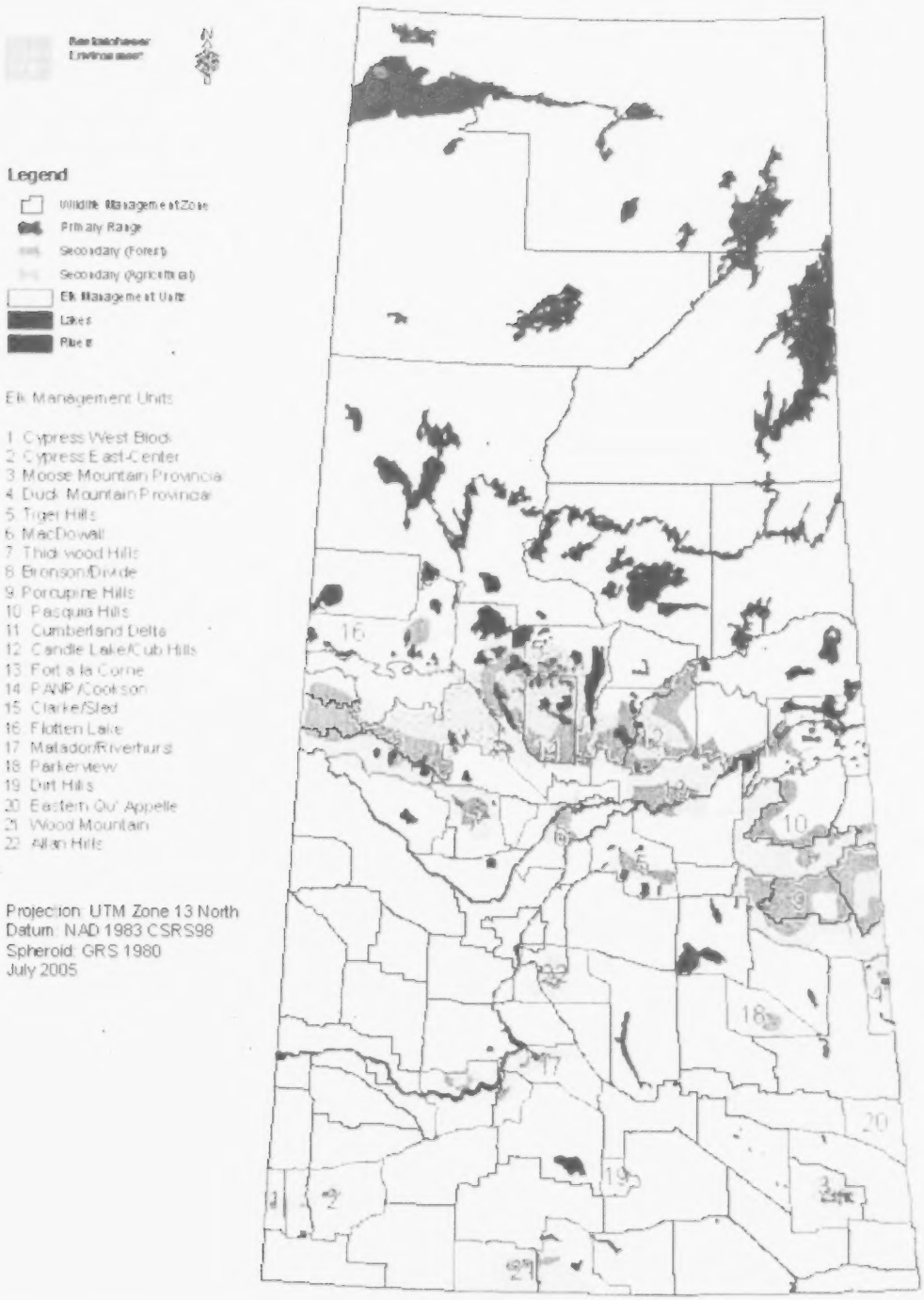

Figure 2. Elk management units (EMUs).

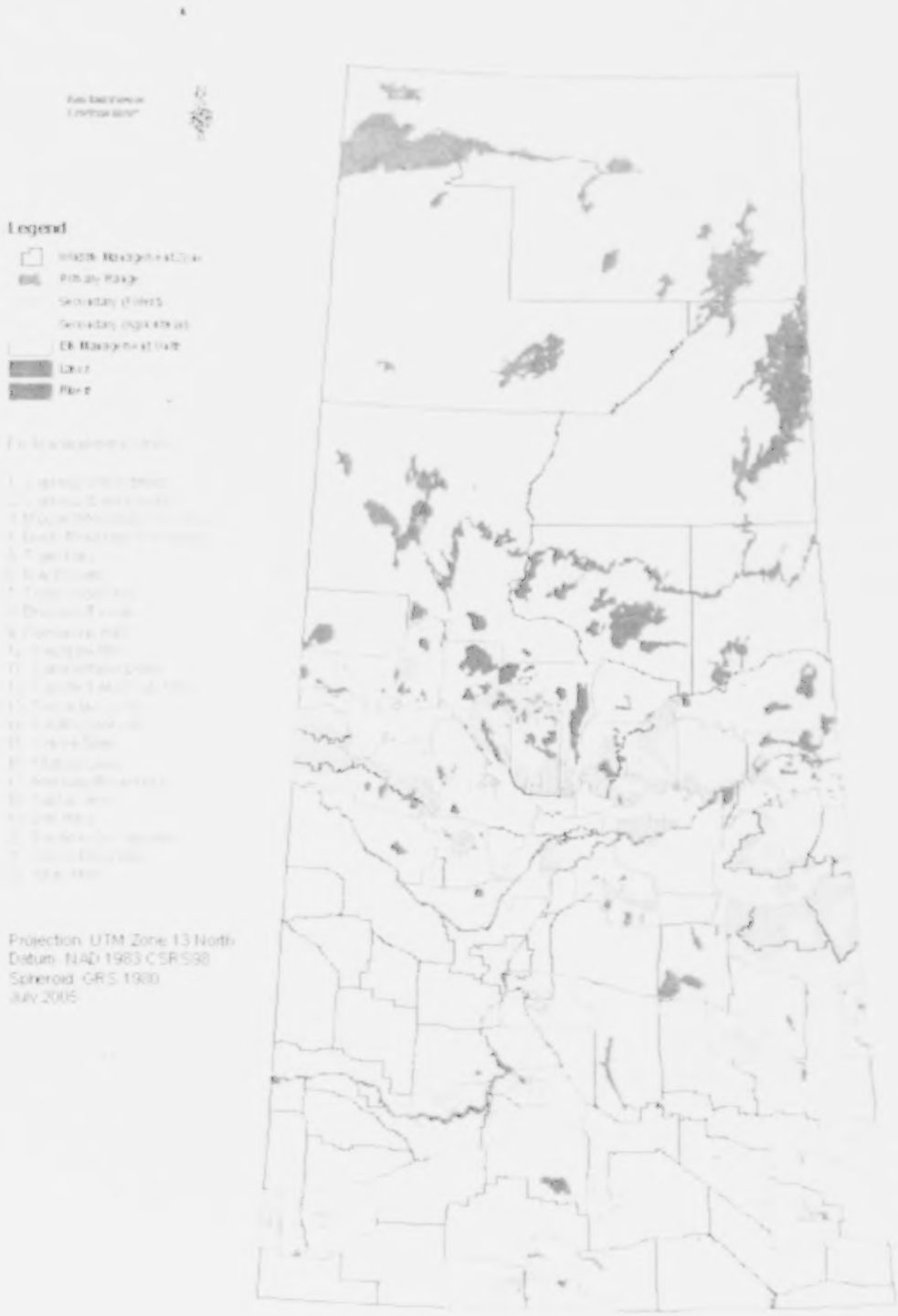

Figure 2 Elk management units (EMUs)

2.1 Survey Data

Table 1 summarizes current population size in relation to long-term objectives (Arsenault 1998) based on interpolation from limited survey data. A summary of population structure is presented in Table 2.

Table 1. Winter elk population objectives and survey block densities based on aerial survey sampling, 2001/02–2003/04.

Elk Management Unit (EMU)	WMZs	Estimate Winter Population Size		Survey Area (km²)	Survey Estimated Elk Population Size		
		Long-term Objective	2003/04 Estimate		2001/02	2002/03	2003/04
Cypress West Block	7 (west ½)	750	741		906	1,023	741
Cypress East-Center	6, 7 (east ½)	200	592		–	–	592
Moose Mountain	33	400	383		–	–	–
Duck Mountain	37	400	354		–	–	–
Tiger Hills	42	350	309		–	–	–
MacDowall Forest	51, 52	200	200		–	–	–
Thickwood Hills	54	200	214	2,950	–	–	–
Bronson-Divide	47, 67, 68N, 68S	750	562		–	–	–
Porcupine Hills	48, 56, 57	4,500	5,012		–	–	–
Pasquia Hills	49, 58, 59	1,500	1,735		–	–	–
Cumberland Delta	60-62	750	334		–	–	–
Candle Lake/Cub Hills	63, 64	1,500	1,132		–	–	–
Fort a la Corne	43, 50	450	616		–	–	–
PANP/Cookson	53, PANP	750	700		–	–	–
Clark - Sled	66	1,000	816		–	–	–
Flotton Lake	69	300	170		–	–	–
Matador/Riverhurst	14, 19 (W of hwy 36)	100	64		–	–	62 a
Parkerview	39	300 b	330		–	–	–
Dirt Hills	19 (E of hwy 36)	50	44		–	–	–
Eastern Qu'Appelle	35	50	23		–	–	–
Wood Mountain	1, 2	300 b	330		250 a	300 a	–
Allan Hills c	30	100 c	120	213	80	100 a	–
Total		**14,900 b**	**14,782**				

a Field report from district Conservation Officer
b Adjusted from Arsenault (1998)
c New EMU

Table 2. Aerial survey results of winter elk herd structure, 2001/02–2003/04.

Elk Management Unit (EMU)	WMZ's	2001-2002			2002-2003			2003-2004		
		Bulls/ Cow	Calves/ Cow	n	Bulls/ Cow	Calves/ Cow	n	Bulls/ Cow	Calves/ Cow	n
Cypress W Block	7 (W ½)	--	--	--	--	--	--	--	--	--
Cypress E Block	6, 7 (E ½)	--	--	--	--	--	--	--	--	--
Moose Mountain	33	--	--	--	--	--	--	--	--	--
Duck Mountain	37	--	--	--	--	--	--	--	--	--
Tiger Hills	42	--	--	--	--	--	--	--	--	--
MacDowall Forest	51, 52	--	--	--	--	--	--	--	--	--
Thickwood Hills	54	--	--	--	--	--	--	--	--	--
Bronson/Divide	47, 67, 68N, 68S	--	--	--	--	--	--	--	--	--
Porcupine Hills	48, 56, 57	--	--	--	--	--	--	--	--	--
Pasquia Hills	49, 58, 59	--	--	--	--	--	--	--	--	--
Cumberland Delta	60 – 62	--	--	--	--	--	--	--	--	--
Candle Lake/ Cub Hills	63, 64	--	--	--	--	--	--	--	--	--
Fort a la Corne	43, 50	--	--	--	--	--	--	--	--	--
PANP/Cookson	53, PANP	--	--	--	0.20	0.45	278	--	--	--
Clark/Sled	66	--	--	--	--	--	--	--	--	--
Flotton Lake	69	--	--	--	--	--	--	--	--	--
Matador/Riverhurst	14, 19 (W hwy 36)	--	--	--	--	--	--	--	--	--
Parkerview	39	--	--	--	--	--	--	--	--	--
Dirt Hills	19 (E hwy 36)	--	--	--	--	--	--	--	--	--
Eastern Qu'Appelle	35	--	--	--	--	--	--	--	--	--
Wood Mountain	1, 2	--	--	--	--	--	--	--	--	--
Allan Hills	30	--	--	--	--	--	--	--	--	--

2.2 Biological Sample Collections

Table 3. Summary of cementum age classes of harvested elk, 1999-2003 hunting seasons.

Age Class	1999		2000		2001		2002		2003	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0.5	–	4	4	5	7	8				
1+	39	8	41	10	32	7				
2+	41	9	49	10	54	32				
3+	23	9	50	14	26	25				
4+	15	7	19	11	19	17				
5+	8	4	10	6	9	6				
6+	2	7	8	8	4	12				
7+	1	5	3	10	2	6				
8+	1	4	3	7	2	5				
9+	2	3	1	3	3	6				
10+	1	–	–	2	–	1				
11+	–	2	–	2	–	2				
12+	2	2	–	2	–	2				
13+	–	1	1	1	–	3				
14+	–	2	–	–	–	4				
15+	–	–	–	–	–	–				
>15+	–	3	–	2	–	3				
n =	135	66	185	88	159	139	[a]	[a]	[a]	[a]
Mean age of ≥ 1.5	3.23	6.24	3.36	5.74	3.30	5.51	[a]	[a]	[a]	[a]
Antler Class	Proportion (%) in Antler Class									
A	22		21		35					
B	12		11		6					
C	11		13		17					
D	31		29		17					
E	17		11		13					
F	8		14		12					
n =	111		123		127		[a]	[a]	[a]	[a]

[a] Data not available.

2.3 Mortality

2.3.1 License Sales

Table 4. Summary of provincial elk license sales and harvest, 1980-2003.

Hunt Year	Regular Licenses Issued	Regular Season Harvest					Draw Licenses Issued	Draw Season Harvest				
		Bulls	Cows	calves	Unkn	Total		Bulls	Cows	calves	Unkn	Total
1980	2,331	0	0	0	254	254	910	0	0	0	307	307
1981	2,774	199	0	0	51	250	900	98	175	45	0	318
1982	3,020	167	0	0	23	190	700	62	45	16	0	123
1983	3,187	265	0	0	43	308	894	127	107	39	0	273
1984	3,698	543	121	35	0	699	784	136	158	44	0	338
1985	3,240	241	15	20	0	276	1,085	106	91	44	0	241
1986	2,819	427	23	15	0	465	1,241	176	175	51	0	402
1987	2,198	372	11	3	0	386	1,288	155	178	74	10	417
1988	2,887	419	5	0	0	424	1,119	147	122	44	0	313
1989	2,599	459	30	4	0	493	1,265	147	234	74	6	461
1990	3,051	330	6	9	0	345	1,764	208	276	147	0	631
1991	3,344	495	16	11	0	522	2,130	267	428	132	4	831
1992	3,699	566	0	0	0	566	2,144	200	299	99	22	620
1993	3,214	569	4	0	0	573	2,018	233	182	66	20	501
1994	6,571	665	351	178	0	1,194	580	109	96	37	0	242
1995	4,772	742	234	113	9	1,098	1,531	95	154	72	8	329
1996	4,594	813	326	130	0	1,269	1,308	131	286	89	1	507
1997	5,151	748	262	145	0	1,155	1,310	150	321	130	22	623
1998	4,878	840	65	32	0	937	1,339	131	407	81	0	619
1999	4,312	870	51	29	41	991	1,512	130	418	132	16	696
2000	5,030	1,082	35	21	7	1,145	1,796	169	535	192	16	912
2001	4,795	1,016	82	12	12	1,122	1,940	213	684	203	23	1,123
2002	4,660	945	83	7	0	1,035	1,950	197	684	119	0	1,000
2003	5,184	1,474	102	25	10	1,611	2,030	219	728	228	38	1,213
5 yr (1999-2003) Mean	4,796	—	—	—	—	1,181	1,846	—	—	—	—	989

2.3.2 Hunting Activity and Harvest

There are no data available to assess the impact of subsistence harvest. Saskatchewan resident licensed harvest and hunting activity are summarized in Table 5.

Table 5. Provincial resident elk harvest by elk management unit (EMU), 2003 compared to previous year and 10-yr (1994-2003) mean. (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest by season and WMZ).

EMU / WMZs	Hunt Year	# Zone Hunters	Harvest					Hunter-days	Hunter-days/ Animal
			Bulls	Cows	Calves	Unkn	Total		
Cypress W Block 7 (W ½)	2002 (a)	200	18	30	12	0	60	860	14.3
	2003	203	0	62	20	14	96	663	6.9
	10-yr mean	139	23	24	10	2	59	616	10.5
Cypress E Block 6, 7 (E ½)	2002 (a)	104	35	12	2	0	49	574	11.7
	2003	121	33	8	3	0	44	623	14.2
	10-yr mean	105	23	8	3	0	33	472	14.2
Moose Mountain 33	2002 (a)	29	7	6	0	0	17	104	6.1
	2003	26	13	8	1	0	22	82	2.8
	10-yr mean	32	9	7	2	0	18	146	8.1
Duck Mountain 37	2002 (a)	97	16	27	4	0	47	544	11.6
	2003	98	17	24	8	0	49	400	8.2
	10-yr mean	94	12	19	5	2	39	433	11.2
Tiger Hills 42	2002	117	46	31	9	0	86	510	5.9
	2003	126	43	28	15	0	86	681	7.9
	10-yr mean	106	21	19	6	0	47	439	9.3
MacDowall Forest 51, 52	2002	25	0	25	0	0	25	113	4.5
	2003	25	15	0	0	0	15	98	6.5
	10-yr mean	25	7	4	0	0	11	125	10.9
Thickwood Hills 54	2002		No season						
	2003		No season						
Bronson-Divide 47, 67, 68N, 68S	2002	190	7	14	0	0	21	745	35.5
	2003	187	30	0	0	0	30	795	26.5
	10-yr mean	122	10	1	1	0	12	530	42.4
Porcupine Hills 48, 56, 57	2002	3,128	587	290	37	0	914	14,059	15.4
	2003	3,772	744	311	96	15	601	16,846	14.4
	10-yr mean	3,330	524	253	83	13	467	15,557	17.8
Pasquia Hills 49, 58, 59	2002	2,364	224	213	27	0	464	10,655	23.0
	2003	2,445	439	280	61	9	789	8,909	11.3
	10-yr mean	1,750	250	161	56	5	472	8,139	17.2
Cumberland 60 – 62	2002	109	21	0	0	0	21	429	20.1
	2003	153	20	0	0	0	20	597	29.9
	10-yr mean	143	19	1	1	1	22	642	29.2
Candle Lk.-Cub Hills 63, 64	2002	130	14	0	0	0	14	547	39.1
	2003	204	15	5	0	0	20	1,066	53.3
	10-yr mean	149	18	1	0	0	19	601	31.8
Fort a la Corne 43, 50	2002 (a)	655	110	90	22	0	222	3,070	13.8
	2003	665	170	61	37	0	268	3,475	13.0
	10-yr mean	523	105	55	17	1	179	2,349	13.2
PANP – Cookson 53, PANP	2002	267	41	7	7	0	55	915	16.6
	2003	224	15	20	15	0	50	856	17.1
	10-yr mean	199	17	10	6	1	33	936	28.1
Clark-Sled 66	2002	20	0	0	0	0	0	116	na
	2003	31	0	0	0	0	0	117	na
	10-yr mean	37	2	0	0	0	2	157	104.9

Table 5. (Continued).

EMU / WMZs	Hunt Year	# Zone Hunters	Harvest					Hunter-days	Hunter-days/ Animal
			Bulls	Cows	Calves	Unkn	Total		
Flotton Lake 69	2002	75	0	7	0	0	7	293	41.8
	2003	46	5	0	0	0	5	382	76.4
	10-yr mean	51	4	1	0	0	4	237	53.9
Matador/Riverhurst 14, 19 (W hwy 36)	2002				No season				
	2003				No season				
Parkerview 39	2002 (a)	53	10	15	6	0	31	260	8.4
	2003	56	16	24	3	0	43	223	5.2
	3-yr Mean	54	12	15	5	0	33	250	7.6
Dirt Hills 19 (E hwy 36)	2002				No season				
	2003				No season				
Eastern Qu'Appelle 35	2002				No season				
	2003				No season				
Wood Mountain 1, 2	2002				No season				
	2003				No season				
Allan Hills 30	2002				No season				
	2003				No season				
EMU TOTAL	2002	7,488	1,136	760	126	0	2,022	33,569	16.6
	2003	8,382	1,575	831	259	38	2,030	35,793	13.2
	10-yr mean	6,909	1,063	594	198	25	1,590	31,843	16.9

(a) Phone survey results used in place of Hunter Harvest Survey results.

2.3.3 Chronic Wasting Disease

Table 6. CWD sample collection results for wild elk, 1997-2003.

Sampling Period	Usable Samples				Confirmed CWD Positives				
	♂	♀	Sex Unkn	Total Samples	Sex	Age (yrs)	UTM Coordinates (NAD 27, Z13) Easting	Northing	General Location
1997	--	--	--	0	---------- No samples submitted ----------				
1998	2	0	0	2	---------- No CWD positives ----------				
1999	35	10	0	45	---------- No CWD positives ----------				
2000	18	69	2	89	---------- No CWD positives ----------				
2001	144	195	1	340	---------- No CWD positives ----------				
2002	56	106	0	162	---------- No CWD positives ----------				
2003	36	112	0	148	---------- No CWD positives ----------				

2.4 Elk Relocation Program

Table 7. Summary of recent elk relocations in Saskatchewan, 1980-2003.

Year	Source	Destination	Adults		Yearlings		Calves		Unkn	Total	Purpose
			M	F	M	F	M	F			
1982	EINP	Thickwood Hills	3	21	2	3	2	-	-	31	Supplement low population
1985	EINP	Cub Hills	7	11	7	5	6	3	-	39	Restock into historically used forest habitat
1985	EINP	Bronson Forest	14	9	3	-	2	4	-	32	Restock into historically used forest habitat
1989	EINP	Cub Hills	6	6	12	3	6	8	-	41	Increase density for sport hunting
1989	EINP	Helene Lake	3	38	6	2	6	12	5	72	Increase density for sport hunting
1990	EINP	Helene Lake	10	21	9	3	9	7	-	59	Supplement population that is below carrying capacity
1991	Cypress Hills	Cub Hills	4	12	2	7	8	16	-	49	Restock historically used forest habitat
1991	Boughen Nursery	Cub Hills	-	5	-	-	-	-	-	5	Reduce depredation at nursery
1992	Cypress Hills	Candle Lake	6	37	4	2	29	30	-	108	Restock historically used forest habitat
1992	EINP	Candle Lake	17	15	7	3	6	7	-	55	Restock historically used forest habitat
1992	Boughen Nursery	Candle Lake	-	3	-	-	2	2	-	7	Reduce depredation at nursery
1992	Boughen Nursery	N of Tobin Lake	-	2	-	-	1	1	-	4	Reduce depredation at nursery
1993	Cypress Hills	Sled Lake	-	7	-	-	17	11	-	35	Restock into historically used, recently logged forest habitat
1993	EINP	Sled Lake	9	12	5	3	2	1	-	32	Restock into historically used, recently logged forest habitat
1994	EINP	Sled Lake	1	34	1	2	8	17	-	63	Restock into historically used, recently logged forest habitat
1994	EINP	Candle Lake	19	25	3	2	5	9	-	63	Restock historically used forest habitat
1995	Cypress Hills	Sled Lake	-	13	-	-	31	10	-	54	Restock into historically used, recently logged forest habitat
1995	EINP	Sled Lake	42	105	32	31	45	37	2	294	Restock into historically used, recently logged forest habitat
1998	Cypress Hills	Cumberland House	-	6	4	3	19	13	-	45	Reduce Cypress Hills population and restock historic habitat
1999	EINP	Candle Lake/Cub Hills	10	80	49	24	69	49	1	340	Restock into historically used, recently logged forest habitat
2000	Cypress Hills	Candle Lake/Cub Hills	-	25	4	-	15	10	-	54	Restock historically used forest habitat (Nipekemew Burn)
2000	EINP	Candle Lake/Cub Hills	65	189	-	-	63	62	-	379	Restock into historically used, recently logged forest habitat
2002	Cypress Hills	Weyakwin	-	33	8	-	9	13	-	63	Restock into historically used, recently logged forest habitat
2003-present	No Relocations										

3.0 Management Strategies

3.1 Southern

- Cypress Hills E and W populations exceed the EMU objectives. Proximity of CWD on game farms and in the wild is considered to be too high of a risk to allow trapping and relocation of elk (from E Block) to reduce population size. Consequently, hunter opportunities will be further increased in an attempt to reduce populations in the Cypress W and Cypress E-C EMUs to their respective long-term population objectives in 2004.
- Maintain season structure and quota for Moose Mountain EMU.
- Maintain season structure and quota for Duck Mountain EMU as a means to maintaining hunting pressure on farmland elk populations where elk damage to crops and stacked forage are a concern.
- Implement new draw seasons in for Wood Mountain EMU, Allan Hills EMU, and Thickwood Hills EMU in 2004.

3.2 Northern

- Because of the potential to over-harvest some of the forest elk herds, the bag limit during both weeks of the regular elk season in 2002 and 2003 was restricted to bulls-only.
- The antlerless seasons facilitate a controlled harvest (through quotas) in order to stabilize forest fringe elk herds and minimize crop depredation.
- The Pasquia and Porcupine EMU strategies are intended to maintain high quality elk hunting seasons with a focus on distributing hunters to prevent overcrowding, to provide a measure of protection for prime breeding bulls, and to minimize elk depredation concerns. The harvest strategy is designed to maintain stable populations within their long-term population objectives.
- Continue maximizing elk herd growth in the forest and within the tolerance of landowners along the forest/agriculture interface.
- Continue to purchase prime elk habitat lands in agricultural areas under the Fish and Wildlife Development Fund and in partnership with the Saskatchewan Wildlife Federation and Rocky Mountain Elk Foundation.

4.0 Literature Cited

Arsenault, A.A. 1998. Saskatchewan elk *(Cervus elaphus)* management strategy. Sask. Envir. And Resour. Manage. Fish and Wildl. Tech Rep. 98-1. 90 pp.

Moose *(Alces alces)*

1.0 Long-term Management Objectives

- Maintain stable winter populations in all Moose Management Units (MMUs) to attain a provincial winter population of 50,080 ±10%.
- Maintain adequate adult sex ratios in all MMU's based on the following relationship: $y = 108.5 - 210.5x + 150.8x^2$, where y = number of bulls/100 cows and x = moose density (moose/km²) per Arsenault (2000).
- Maintain the winter calf/100 cow ratio >40 calves/100 cows in all MMUs
- Retain 107,600 km² of occupied primary moose habitat.

2.0 Population Status

The 2003 winter provincial moose population was estimated to be about 43,196 moose, which is 14% below the long-term population objective of 50,080 ±10% moose (Figure 1, Table 1). Moose Management Units (MMUs) are illustrated in Figure 2.

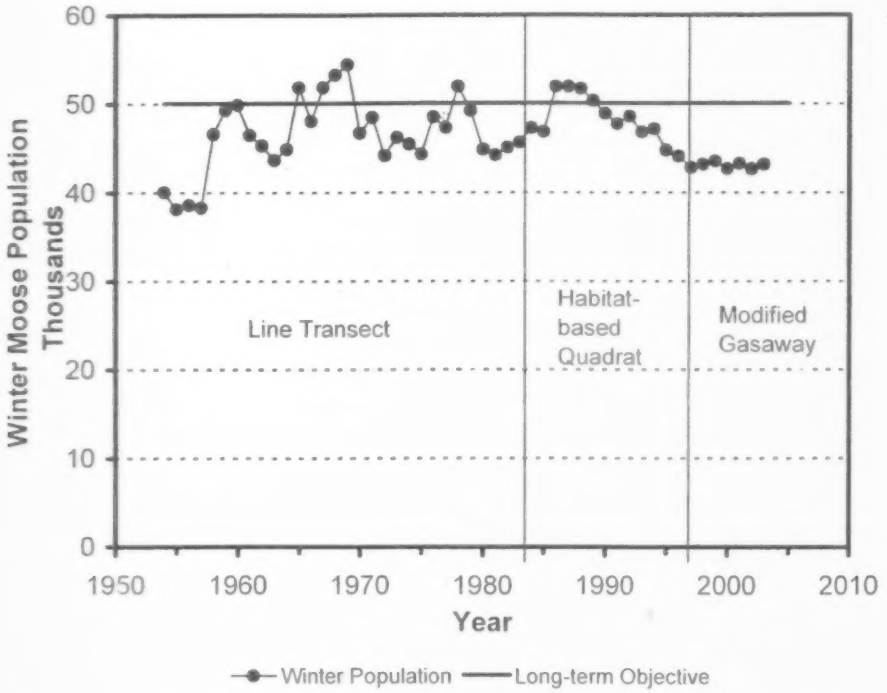

Figure 1. Changes in winter moose population in Saskatchewan, 1954 to present. Habitat-based quadrat surveys were stratified by per Stewart 1983. Modified Gasaway survey method was based on Gasaway et al 1986, and Lynch and Schumaker 1995.

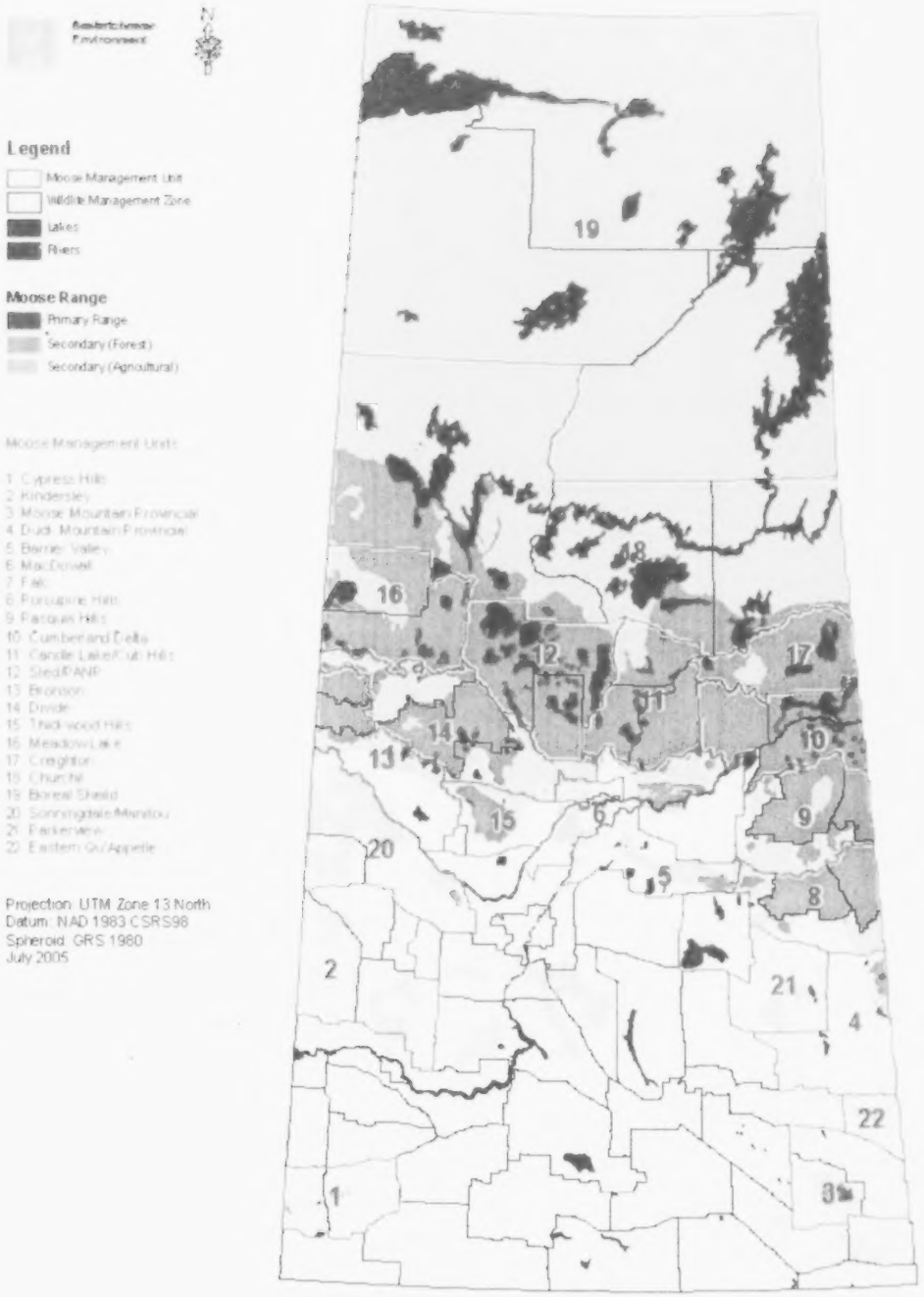

Figure 2. Moose management units (MMUs).

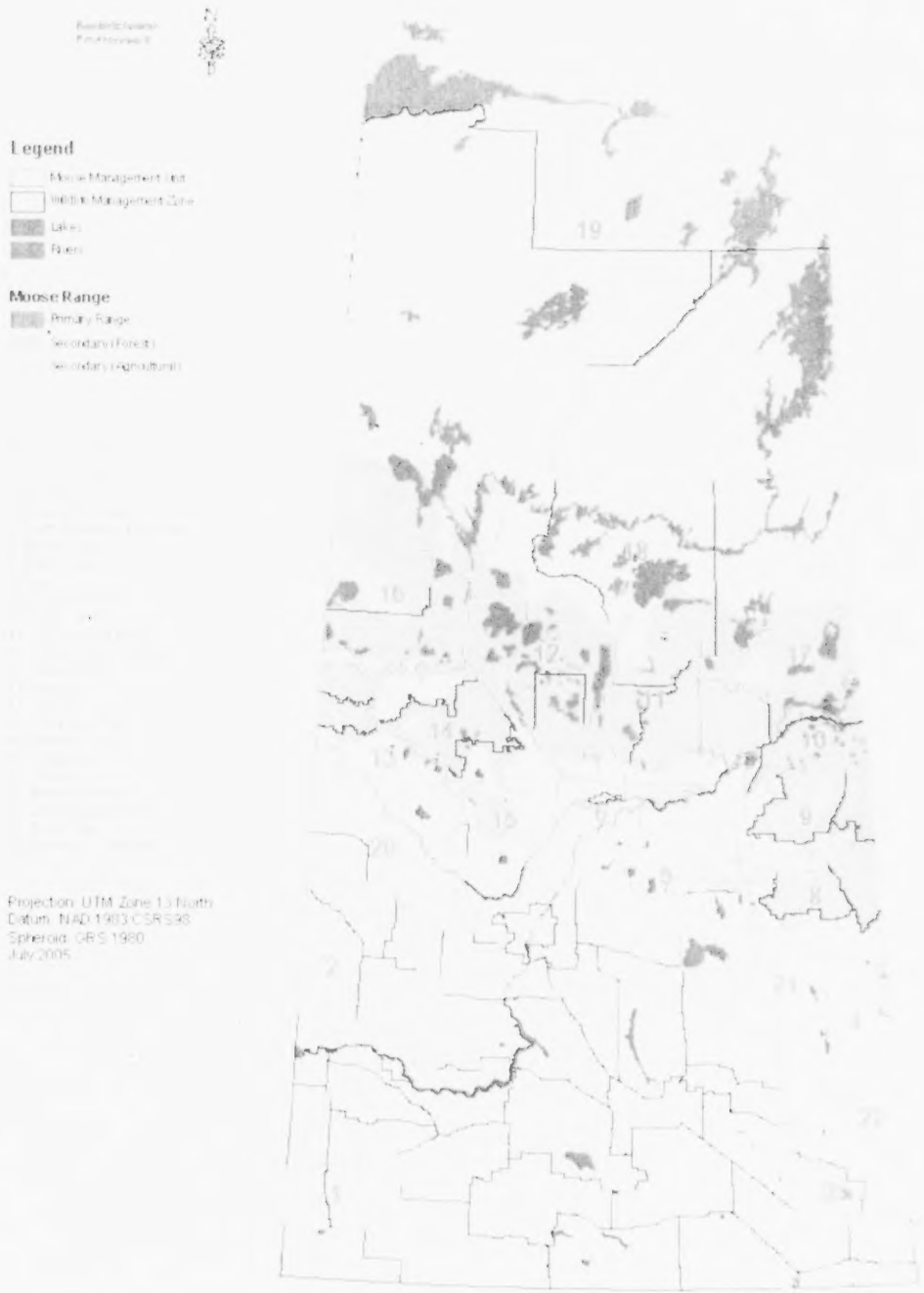

Figure 2. Moose management units (MMUs)

Table 2. Aerial survey results of winter population structure, 2000/01–2003/04.

Moose Management Unit (MMU)	WMZs	Long-term Objective		2000/01			2001/02			2002/03			2003/04		
		Bulls/ Cow	Calves/ Cow	Bulls/ Cow	calves/ Cow	n	Bulls/ Cow	calves/ Cow	n	Bulls/ Cow	calves/ Cow	n	Bulls/ Cow	calves/ Cow	n
Cypress Hills	6, 7	0.35	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Kindersley	25 – 27	0.62	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Moose Mountain	33	0.48	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Eastern Qu'Appelle	35	0.98	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Duck Mountain	37	0.40	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Parkerview	39	0.98	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Barrier Valley	40, 42	0.59	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Sonningdale	45	0.59	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
MacDowall Forest	51, 52	0.53	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Fort a la Corne	43, 50	0.67	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Porcupine Hills	48, 56, 57	0.38	≥ 0.40	--	--	--	--	--	--	0.28	0.42	1,073	--	--	--
Pasquia Hills	49, 58, 59	0.36	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Cumberland Delta	60 – 62	0.43	≥ 0.40	0.48	0.39	321	--	--	--	--	--	--	--	--	--
Candle Lk / Cub Hills	63 – 65	0.52	≥ 0.40	0.64	0.59	189	--	--	--	--	--	--	--	--	--
Sled Lk / PANP	66, PANP	0.68	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Bronson Forest	47, 68N, 68S	0.40	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Divide Forest	53, 55, 67	0.40	≥ 0.40	--	--	--	--	--	--	--	--	--	0.46	0.43	385
Thickwood Hills	54	0.51	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Meadow Lake / PAWR	69, PAWR	0.64	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Creighton	70	0.89	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Churchill	71 – 73	0.82	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--
Boreal Shield	74 – 76	1.00	≥ 0.40	--	--	--	--	--	--	--	--	--	--	--	--

2.2 Biological Sample Collections

The age structure of harvested animals is presented in Table 3. Table 4 compares the mean age of moose harvested in the Pasquia (WMZs 49, 58, 59), Porcupine (WMZs 48, 56, 57) and Cumberland WMZs 60-62) MMUs to the provincial moose harvest.

Table 3. Summary of cementum age classes of harvested moose, 1998–2003 hunting seasons.

	1998		1999		2000		2001		2002		2003	
Age Class	M	F	M	F	M	F	M	F	M	F	M	F
0.5	50	47	13	11	60	59	72	66	22	18	47	27
1+	78	6	29	1	100	13	98	5	42	4	44	9
2+	61	8	40	7	70	8	89	5	50	9	36	4
3+	42	6	46	6	26	2	46	9	13	7	17	1
4+	25	6	34	7	17	2	16	3	9	1	11	6
5+	9	4	19	2	8	0	12	3	5	2	4	0
6+	12	2	8	1	11	3	6	1	4	2	0	1
7+	3	1	8	0	4	1	7	1	3	0	3	1
8+	2	1	0	2	3	1	5	2	3	0	0	1
9+	0	2	1	1	2	0	2	0	2	0	4	0
10+	3	0	1	0	2	1	2	1	1	0	2	1
11+	1	0	1	0	1	0	1	2	0	1	0	0
12+	1	0	0	0	1	0	0	1	0	0	0	0
13+	0	0	0	0	0	0	0	0	0	1	0	0
14+	0	0	0	1	1	0	0	0	1	0	0	0
15+	0	0	0	0	0	0	0	0	0	0	0	0
>15+	0	0	0	0	0	0	0	0	0	0	0	0
n =	287	83	200	39	306	90	356	99	155	45	168	51
Mean age of ≥2.5 year old moose	3.99	4.60	4.19	4.76	4.05	4.56	3.80	5.39	3.92	4.37	3.93	4.90

Table 4. Mean age of adult (2.5 years and older) moose from check stations and comparison of immature (1.5 to 3.5 age classes) to mature (>3.5 age classes) bulls, 1967–2003.

Hunt Year	Mean Age				Comparison of Bulls	
	Cows (Provincial)	Cows NE MMU's	Bulls (Provincial)	Bulls NE MMU's	Harvested Bulls 1.5-3.5 yrs old (%)	Harvested Bulls >3.5 yrs old (%)
1967	5.80	–	4.10	–	–	–
1968	5.50	–	4.39	–	–	–
1969	5.80	–	4.70	–	–	–
1970	6.20	–	5.00	–	–	–
1971	6.20	–	5.00	–	–	–
1972	6.30	–	5.30	–	–	–
1973	6.80	–	5.30	–	–	–
1974	5.70	–	4.70	–	–	–
1975	6.40	–	5.30	–	–	–
1976	5.30	–	4.60	–	–	–
1977	5.10	–	4.30	–	–	–
1978	4.50	–	4.30	–	72	28
1979	5.10	–	4.30	–	73	27
1980	6.20	–	4.60	–	61	39
1981	5.60	–	4.50	–	64	36
1982	5.60	–	4.80	–	63	37
1983	5.50	–	4.60	–	74	26
1984	6.20	–	4.50	–	69	31
1985	5.52	5.69	4.33	4.30	74	26
1986	6.00	5.53	4.11	4.05	77	23
1987	6.13	6.10	4.16	3.91	79	26
1988	5.59	5.65	3.90	3.79	79	21
1989	5.63	5.75	4.18	4.00	74	26
1990	5.14	5.14	4.08	3.94	76	24
1991	5.38	5.53	4.54	4.06	76	24
1992	6.08	6.25	3.89	3.80	81	19
1993	6.04	6.10	3.88	3.88	83	17
1994	6.04	5.82	3.88	4.02	80	20
1995	6.39	6.40	3.75	3.62	85	15
1996	4.82	4.50	3.82	3.68	77	23
1997	5.19	5.03	4.34	4.03	68	23
1998	4.60	4.66	3.99	4.03	76	24
1999	4.76	5.30	4.19	4.14	61	39
2000	4.56	4.31	4.05	3.86	80	20
2001	5.39	5.46	3.80	3.66	82	18
2002	4.37	4.62	3.92	3.41	79	21
2003	4.90	5.50	3.93	3.94	80	20

2.3 Mortality

2.3.1 Moose Tick *(Dermacentus albipictus)*

Moose are generally infested with moose ticks annually, but environmental conditions can result in major tick loads in some years. The extended mild fall of 2001 resulted in a protracted period of tick infestation. As a result, field reports suggest severe moose mortality occurred during the spring of 2002 in the Porcupine Hills (WMZs 56, 57), Greenwater Lake Provincial Park (WMZ 28), and southern and western slopes of the Pasquia Hills (WMZ 59). A sample of 225 dead moose was sampled by Saskatchewan Environment over the spring of 2002, which was composed of 25 adult

bulls, 19 yearling bulls, 28 adult cows, 18 yearling cows, 77 calves and 58 unclassified moose. Of those classified (n = 167), 26% were bulls, 28% were cows and 46% were calves. The 2001/02 winter population structure for Pasquia and Porcupine MMUs (pooled) prior to the tick mortality was estimated to be 19% bulls, 57% cows and 24% calves (n =10,493 moose). The tick infestation is thought to have resulted in reduced Pasquia and Porcupine 2002 winter populations by about 8%. There were no significant reports of winter tick mortality for spring of 2003.

2.3.2 License Sales

Table 5. Summary of provincial moose license sales and annual harvest, 1980-2003.

Hunt Year	Licenses Sold					Moose Harvest				
	Regular (Bull-calf)	Draw (Either-sex)	Archery	Guided (Bull-calf)	Total License Sales	Regular (Bull-calf)	Draw (Either-sex)	Archery	Guided (Bull-calf)	Total
1980	11,077	2,355	--	284	13,716	4,133	1,365	--	274	5,772
1981	10,542	2,400	--	289	13,232	1,668	579	--	112	2,359
1982	10,212	2,034	--	282	12,527	2,098	456	--	93	2,647
1983	7,894	1,967	29	212	10,073	1,534	579	4	70	2,187
1984	8,006	1,898	41	194	10,165	2,371	821	3	90	3,285
1985	8,125	2,105	38	239	10,507	1,413	653	2	92	2,160
1986	9,159	2,088	31	208	11,486	2,554	910	6	96	3,566
1987	8,653	2,133	43	217	11,046	2,309	1,067	5	108	3,489
1988	9,181	2,202	34	235	11,652	2,768	1,144	2	157	4,071
1989	9,557	1,883	46	252	11,738	3,471	1,121	14	156	4,762
1990	9,240	2,077	41	249	11,607	2,060	896	7	98	3,061
1991	9,238	2,014	--	212	11,464	2,935	1,186	--	161	4,282
1992	8,888	2,095	--	206	11,189	2,200	1,042	--	174	3,416
1993	8,153	2,280	--	206	10,639	2,595	1,195	--	82	3,872
1994	9,316	2,365	--	213	11,894	2,480	1,121	--	113	3,601
1995	9,802	2,053	--	285	12,143	3,864	1,199	--	61	5,124
1996	7,905	2,082	--	223	10,580	2,199	982	--	67	3,248
1997	6,668	1,717	--	237	8,622	1,474	829	--	90	2,393
1998	8,368	901	--	249	9,518	2,460	526	--	122	3,108
1999	8,436	949	--	227	9,603	2,037	532	--	48	2,617
2000	8,521	948	--	272	9,721	2,821	591	--	98	3,510
2001	9,287	947	--	254	10,488	3,519	559	--	73	4,151
2002	5,845	918	--	257	7,020	1,447	436	--	62	1,945
2003	6,333	949	--	300	7,582	2,108	542	--	98	2,748
10-yr (1994-2003 Mean	8,048	2,003	--	252	10,303	2,441	732	--	83	3,256

2.3.3 Hunting Activity and Harvest

There are no data available to assess the impact of subsistence harvest. Saskatchewan resident licensed harvest and hunting activity is summarized in Table 6. Table 7 compares the early and late regular season harvests.

Table 6. Provincial resident moose harvest by moose management unit (MMU), 2003 compared to previous year and 10-yr (1994–2003) mean (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest by season and WMZ).

MMU/ WMZ(s)	Hunt Year	# Zone Hunters	Harvest				Hunter-days	Hunter-days/ Animal
			Bulls	Cows	Calves	Total		
Cypress Hills WMZ 6, 7	2002	64	25	17	5	47	160	3.4
	2003	64	13	18	9	40	168	4.2
	10-yr mean	54	22	17	6	45	166	3.7
Kindersley WMZ 25 - 27	2002			No season				
	2003			No season				
	10-yr mean			No season				
Moose Mountain WMZ 33	2002			No season				
	2003			No season				
	10-yr mean			No season				
Eastern Qu'Appelle WMZ 35	2002			No season				
	2003			No season				
	10-yr mean			No season				
Duck Mountain WMZ 37	2002	175	27	14	8	49	748	15.3
	2003	145	34	25	9	68	630	9.3
	10-yr mean	128	27	18	6	51	589	11.6
Parkerview WMZ 39	2002			No season				
	2003			No season				
	10-yr mean			No season				
Barrier Valley WMZ 40, 42	2002	56	32	9	9	50	206	4.1
	2003	50	27	11	7	45	180	4.0
	5-yr mean	41	19	9	5	32	135	4.3
MacDowall Forest WMZ 51, 52	2002			No season				
	2003			No season				
	10-yr mean			No season				
Fort a la Corne WMZ 43, 50	2002	190	35	0	7	42	761	18.1
	2003	207	45	3	17	65	907	14.0
	10-yr mean	183	35	5	19	58	847	14.5
Sonningdale WMZ 45	2002			No season				
	2003			No season				
	10-yr mean			No season				

Table 6. Continued.

MMU/ WMZ(s)	Hunt Year	# Zone Hunters	Harvest				Hunter-days	Hunter-days/ Animal
			Bulls	Cows	Calves	Total		
Porcupine Hills WMZ 48, 56, 57	2002	2,223	230	45	251	526	10,768	20.5
	2003	2,541	488	94	511	1,093	11,727	10.5
	10-yr mean	3,487	648	112	496	1,255	17,291	13.8
Pasquia Hills WMZ 49, 58, 59	2002	1,555	165	20	114	299	6,515	21.8
	2003	1,488	289	44	208	541	6,893	12.7
	10-yr mean	2,296	405	73	225	703	10,817	15.4
Cumberland Delta WMZ 60-62	2002	340	26	6	37	69	1,401	20.3
	2003	283	26	8	15	49	1,308	26.7
	10-yr mean	435	60	10	29	99	1,930	19.5
Candle Lk/Cub Hills WMZ 63 - 65	2002	392	55	19	3	77	1,458	18.9
	2003	342	59	11	18	88	1,596	18.1
	10-yr mean	527	93	21	15	129	2,231	17.3
Sled - PANP WMZ 66, PANP	2002	223	26	24	4	54	901	16.7
	2003	248	42	19	5	66	1,217	18.4
	10-yr mean	322	64	12	17	93	1,561	16.8
Bronson Forest WMZ 47, 68N, 68S	2002	301	75	7	20	116	1,216	10.5
	2003	269	70	0	35	119	1,156	9.7
	10-yr mean	337	80	16	42	138	1,559	11.3
Divide Forest WMZ 53, 55, 67	2002	1,180	185	0	109	294	4,643	15.8
	2003	881	164	0	104	268	3,946	14.7
	10-yr mean	1,180	251	13	113	376	5,459	14.5
Thickwood Hills WMZ 54	2002	50	15	7	11	33	190	5.8
	2003	53	12	12	6	30	218	7.3
	10-yr mean	53	8	14	9	31	168	5.4
Meadow Lk - PAWR WMZ 69, PAWR	2002	198	20	0	14	34	833	24.5
	2003	148	40	5	30	75	630	8.4
	10-yr mean	278	63	1	24	88	1,186	13.4
Creighton WMZ 70	2002	177	48	0	0	48	676	14.1
	2003	139	30	0	0	30	734	24.5
	10-yr mean	148	25	0	4	29	852	29.4
Churchill WMZ 71 – 73	2002	342	61	7	14	82	1,346	16.4
	2003	169	30	0	20	50	996	19.9
	10-yr mean	180	33	1	8	41	847	20.6
Boreal Shield WMZ 74 – 76	2002	143	41	0	0	41	594	14.5
	2003	108	50	0	0	50	490	9.8
	10-yr mean	86	33	0	3	36	477	13.3
MMU Total	2002	7,609	1,066	175	606	1,847	32,416	17.6
	2003	7,130	1,419	250	994	2,663	32,796	12.3
	10-yr mean	9,732	1,862	318	1,018	3,424	46,089	13.5

Table 7. Comparison of moose harvest in the early vs late regular (rifle) seasons, 1984–2003.

Hunt Year	Early Regular Rifle Season				Late Regular Rifle Season			
	Season Dates	Total Harvest (Bulls+calves)	Bull Harvest		Season Dates	Total Harvest (Bulls+calves)	Bull Harvest	
			Number	%			Number	%
1984	8 - 13 Oct	415	357	86.0	19 Nov - 1 Dec	1,626	1,040	64.0
1985	7 - 12 Oct	345	259	75.1	18 - 30 Nov	890	543	61.0
1986	6 - 11 Oct	841	681	81.0	17 - 29 Nov	1,443	909	63.0
1987	5 - 10 Oct	691	560	81.0	16 - 28 Nov	1,611	1,015	63.0
1988	3 - 8 Oct	811	657	81.0	21 Nov - 3 Dec	1,891	1,191	63.0
1989	2 - 7 Oct	1,398	1,104	79.0	20 Nov - 2 Dec	1,846	1,052	57.0
1990	8 - 13 Oct	741	548	74.0	19 Nov - 1 Dec	1,307	836	64.0
1991	7 - 12 Oct	1,154	762	66.0	18 - 30 Nov	1,667	984	59.0
1992	5 - 10 Oct	892	723	81.1	16 - 28 Nov	1,134	624	55.0
1993	4 - 9 Oct	924	739	80.0	15 - 27 Nov	1,552	885	57.0
1994	3 - 8 Oct	823	700	85.1	14 - 26 Nov	1,613	903	56.0
1995	2 - 7 Oct	1,237	1,014	82.0	13 - 25 Nov	2,565	1,513	59.0
1996	7 - 12 Oct	979	832	85.0	18 - 30 Nov	1,220	610	50.0
1997	13 - 18 Oct	778	524	67.4	17 - 22 Nov	727	378	52.0
1998	12 - 17 Oct	1,210	783	64.7	16 - 21 Nov	1,204	680	56.5
1999	11 - 16 Oct	925	681	82.5	15 - 20 Nov	1,019	594	58.3
2000	16 - 21 Oct	947	668	70.5	20 - 25 Nov	1,720	891	51.8
2001	15 - 20 Oct	1,973	1,197	60.7	19 - 24 Nov	1,423	684	48.1
2002	a	150	136	90.7	18 - 23 Nov	1,190	664	55.8
2003	a	130	110	84.6	17 - 22 Nov	1,156	978	84.6
Mean		868	652	75.1		1,440	849	58.9

a There was no early rifle season in WMZs 56-69.

2.4 Population Status by MMU

Table 8. Summary of moose population status by MMU.

Moose Management Unit	WMZ	Population Status
Cypress Hills	6, 7	Stable, no problems / issues of concern
Kindersley	25 - 27	No survey data available. Field reports indicate population is growing.
Moose Mountain	33	Growing population at long-term density objective. No problems or issues of concern.
Eastern QuAppelle	35	Very small population at very low density.
Duck Mountain	37	Stable population at long-term density objective. Main concern is low calf recruitment.
Parkerview	39	No survey data available. Field reports indicate population is stable.
Barrier Valley	40, 42	No survey data available. Field reports indicate population is growing.
Sonningdale	45	No survey data available. Field reports indicate population is stable.
MacDowall Forest	51, 52	No survey data available. Field reports indicate population is stable.
Fort a la Corne	43, 50	No survey data available. Field reports indicate population is stable.
Porcupine Hills	48, 56, 57	Winter population slightly below long-term objective. Bull portion of winter population was 17% below long-term objective. Lack of mature breeding bulls, with adult sex ratio 18% below long-term objective. Calf portion of winter population was 16% below long-term objective.
Pasquia Hills	49, 58, 59	Winter population was 17% below long-term objective. Bull portion of winter population was 12% below long-term objective. Lack of mature breeding bulls. Calf portion of winter population was 34% below long-term objective.
Cumberland Delta	60 - 62	Winter population is 54% below the long-term objective. Calf recruitment is very low.
Candle Lake/Cub Hills	63 - 65	Winter population density is 36% below the long-term density objective.
Sled Lake / PANP	66	No recent survey data available. Population density is considered to be 27% below the long-term objective.
Bronson Forest	47, 68S, 68N	Winter population density is 17% below the long-term objective. Adult sex ratio is below long-term objective, with the winter bull population 26% below objective.
Divide Forest	53, 55, 67	Winter survey in January 2004 placed this population very close to it's long-term density and structure objectives.
Thickwood Hills	54	Population is stable and near it's long-term density objective.
Meadow Lake/PAWR	69	Population density is near it's long-term objective. Adult sex ratio is below the recommended level, with the bull portion of the population 22% below the long-term objective.
Creighton	70	Data deficient. Suspect a declining population density in the southern portion of MMU
Churchill	71 - 73	Data deficient.
Boreal Shield	74 - 76	Data deficient.

3.0 Management Strategies

3.1 Northern Harvest Strategies (WMZs 48, 49, 56-76)

In 1997 the early regular season was delayed one week to avoid the rut and conserve bulls in the Porcupine MMU. This change was implemented across the province to avoid increasing hunting pressure in some zones, but harvest data indicates it had no effect on bull conservation in the early season. In addition, the late regular season was reduced to one week as a bull conservation measure. Harvest data indicate this had some success at reducing bull harvest, but overall harvest remained unchanged due to increased calf harvest. The over-harvest of mature bulls in the Pasquia and Porcupine MMUs remains an issue needing resolution.

In 1998, the draw quotas were reduced because of concerns with low moose population densities in Porcupine, Cumberland and Divide MMUs, as indicated by surveys conducted during the winter of 1997. The intent was to reduce hunting pressure on cow moose to stimulate population growth. However, this resulted in higher harvest pressure on mature bulls and a subsequent further decline in mature bull numbers in the Pasquia and Porcupine MMUs.

There were no significant changes to the moose allocation strategy for the 1999, 2000 or 2001 hunting seasons. The early regular rifle season was cancelled in 2002 to offset losses of moose due to moose ticks in the Pasquia and Porcupine MMUs, and as an interim measure to conserve bulls because of poor adult sex ratios and declining population densities in forest MMUs. This was continued in 2003 to reduce harvest pressure on forest populations, particularly on the bull segment to allow for population growth and to improve adult sex ratios.

3.2 Southern Harvest Strategies (WMZs 6, 7, 25 - 27, 33, 35, 37, 39, 40, 42, 43, 50-52)

- Cypress Hills MMU (WMZs 6, 7) – Status quo.
- Kindersley MMU (WMZs 25-27) – Population is too small and at too low of a density to support a sustainable hunting season.
- Moose Mountain MMU (WMZ 33) – An either-sex draw season (quota of 25 licenses) was planned for 2004.
- Eastern QuAppelle (WMZ 35) - Population is too small and at too low of a density to support a sustainable hunting season.
- Duck Mountain MMU (WMZ 37) – Status quo.
- Parkerview (WMZ 39) - Population is too small and at too low of a density to support a sustainable hunting season.
- Barrier Valley MMU (WMZs 40, 42) – Status quo.
- Fort a la Corne MMU (WMZs 43, 50) – the license quota will continue to be restricted to 50 licenses within the Wildlife Management Unit portion of the MMU.
- Sonningdale MMU (WMZ 45 and 46) – There is a sufficient population for a limited sustainable hunting season.

- MacDowall Forest MMU (WMZs 51, 52) - Population is too small and at too low of a density to support a sustainable hunting season.
- Thickwood Hills MMU (WMZ 54) – Status quo.

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Barren-ground Caribou *(Rangifer tarandus)*

1.0 Long-term Management Objectives

- Maintain each herd between population levels adequate to sustain harvest based on the Subsistence Needs Level (SNL) and Total Needs Level (TNL), and levels that are biologically sustainable on herd range, while maintaining good caribou condition.
- To monitor population levels to determine optimum herd size.
- To monitor harvest levels to determine SNL m TNL and optimum harvest levels.
- To protect caribou and their habitat from human disturbance.

2.0 Population Status

2.1 Provincial Overview

The Beverly and Qamanirjuaq caribou herds are jointly managed under the advisement of the Beverly and Quamanirjuaq Caribou Management Board (BQCMB). Both herds calve in Nunavut. The Beverly herd traditionally calves near Beverly Lake and the Thelon River system, and have recently expanded to Gary, Sand and Deep Rose Lakes. The Qamanirjuaq herd calves near Qamanirjuaq Lake. The winter ranges (November to March) of both herds typically extend into Saskatchewan and Manitoba. The Beverly herd has been known to migrate south into northern Saskatchewan as far as Carswell and Cree Lakes. Harvest pressure can be higher than usual in years when their winter range reaches these communities (1979/80). The Qamanirjuaq herd winter range generally extends mainly into northern Manitoba, with some overlap into northern Saskatchewan as far as Reindeer Lake (Figure 1).

2.2 Survey Data

Calving ground surveys of both herds were conducted approximately every 6 years using aerial photography. The last survey was conducted in 1994. Table 1 summarizes population survey results.

2.3 Biological Sample Collections

No data available.

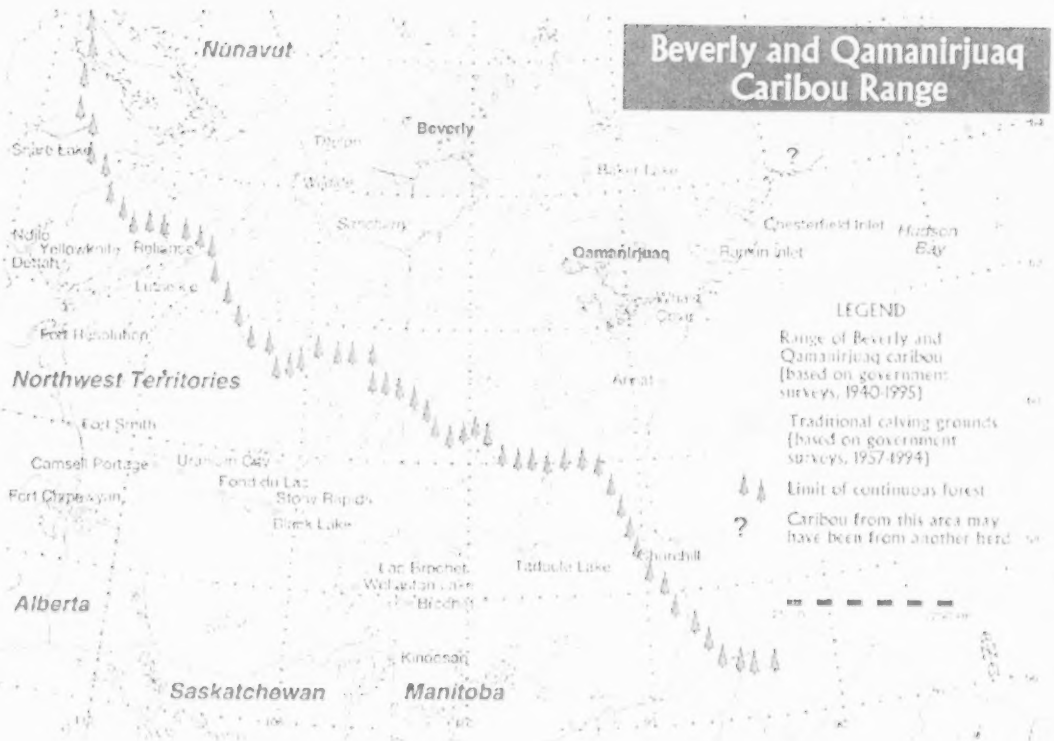

Figure 1. Beverly and Qamanirjuaq caribou herd ranges (from http://www.arctic-caribou.com/range_map.html)

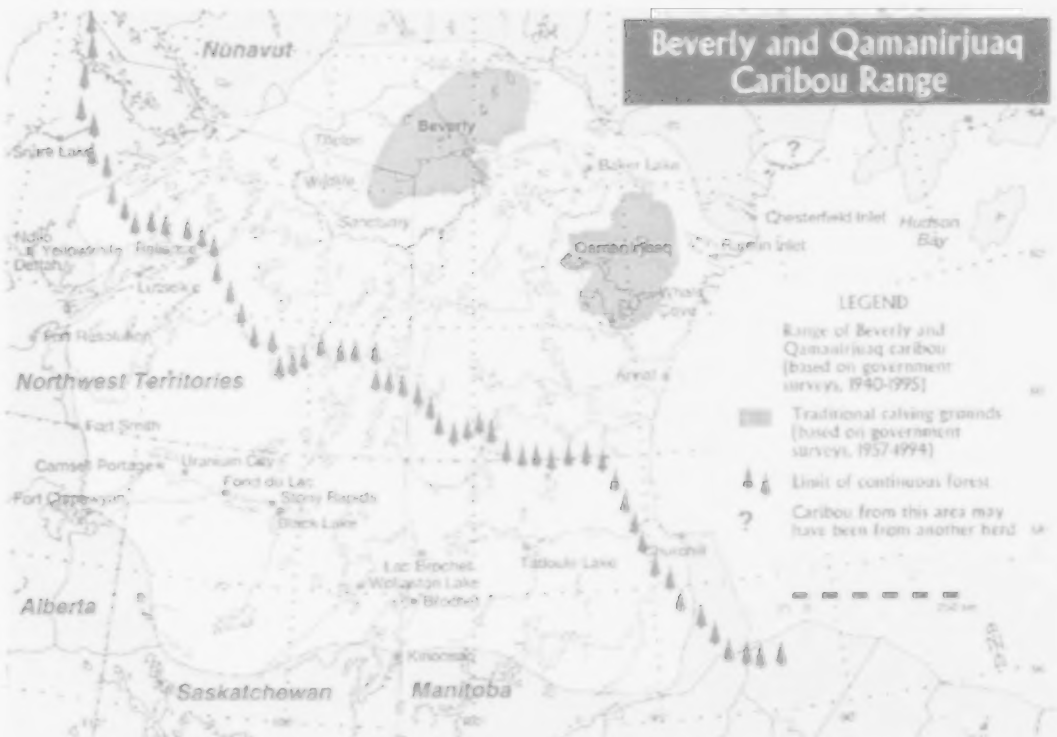

Figure 1 Beverly and Qamanirjuaq caribou herd ranges (from http://www.arctic-caribou.com/range_map.html)

Table 1. Summary of barren-ground caribou population status by herd, 1974-2003.

Survey Year	Beverly Herd			Qamanirjuaq Herd		
	Estimated Population	±S.E.	Recruitment Rate (%)	Estimated Population	±S.E.	Recruitment Rate (%)
1974	177,000	–	–	–	–	–
1975	–	–	–	–	–	–
1976	–	–	–	–	–	–
1977	–	–	–	–	–	–
1978	–	–	–	–	–	–
1979	–	–	–	–	–	–
1980	94,000		–	39,000		–
1981	–	–	–	–	–	–
1982	164,338	72,332	–	–	–	–
1983	–	–	–	230,000	50,000	–
1984	263,691	80,652	–			–
1985	–	–	–	272,000	60,000	–
1986	–	–	–	–	–	–
1987	–	–	–	–	–	–
1988	189,561	70,961	–	221,000	76,000	23
1989	–	–	–	–	–	–
1990	–	–	–	–	–	–
1991	–	–	–	–	–	–
1992	–	–	–	–	–	–
1993	86,728	17,943	–	–	–	–
1994	286,000	106,600	19	496,000	106,600	–
1995	–	–	–	–	–	47
1996	–	–	–	–	–	–
1997	–	–	–	–	–	–
1998	–	–	–	–	–	–
1999	–	–	–	–	–	–
2000	–	–	–	–	–	–
2001	–	–	–	–	–	–
2002	–	–	–	–	–	–
2003	–	–	–	–	–	–

2.4 Mortality

2.4.1 License Sales and Harvest

Only residents of WMZ 76 are eligible to purchase a license to harvest barren-ground caribou. These individuals are entitled to purchase a maximum of 2 either-sex licenses. License sales and subsequent harvest is negligible in Saskatchewan (Table 2).

2.4.2 Subsistence Harvest

This source of harvest is the most significant kind, however, the harvest study was terminated in 1995 due to budget constraints and consequently no harvest data are available for subsequent years.

2.4.3 Predation

Wolves account for 60-70% of calf mortality from the Beverly herd.

Table 2. Barren-ground caribou license sales, 1984-2003.

Hunt Year	License Sales			Harvest	Subsistence Use	
	1st Either-sex License	2nd Either-sex License	Total Issued		Licenses	Harvest
1984	?	?	41	?	?	?
1985	?	?	42	?	?	?
1986	?	?	51	?	?	?
1987	36	25	61	?	?	?
1988	19	15	34	0	?	?
1989	17	12	29	13	?	?
1990	15	12	27	11	?	?
1991	44	33	77	39	24	48
1992	41	32	73	64	26	52
1993	43	34	77	33	10	10
1994	49	35	84	40	64	10
1995	28	22	50	32	32	12
1996	25	22	47	44	4	6
1997	31	27	58	46	Study terminated	
1998	13	9	22	?	?	?
1999	34	26	60	?	?	?
2000	9	9	18	?	?	?
2001*	18	14	32	?	?	?
2002	16	13	29	?	36	?
2003	16	11	27	?	36	?

3.0 Management Strategies

- Monitor industrial development, road and trail access onto the caribou range and recommend mitigation to minimize disturbance to caribou that could result in future herd distribution away from communities and important winter habitat in Saskatchewan.
- Ensure that caribou are accessible and available to traditional users through continued monitoring of herd status and harvest.
- Promote the development of fire management policy that incorporates the fire management recommendations of the Beverly Qamanirjuaq Caribou Management Board (BQCMB). These recommendations are specifically designed to ensure continued access and availability to caribou by the traditional users, and to increase knowledge of caribou ecology.
- Promote and distribute BQCMB information and newsletter to a broad public audience, and encourage attendance of community members to BQCMB related meetings to promote stronger public involvement and gain public support for barren-ground caribou conservation.
- Increase knowledge of caribou ecology and encourage wise use of caribou through cooperation with other northern wildlife management boards, and involvement of local individuals and organizations in caribou management programs.
- Provide adequate incremental funding support for future cooperative population survey and related monitoring efforts.
- Re-establish the harvest study in order to detect crisis herd levels.

- Use the Important Habitats Document and related material to recommend adequate protection of caribou habitat from industrial development and other human activity on caribou range.

- Work with aboriginal representatives on the BQCMB to develop criteria for community involvement in monitoring caribou populations, and to take part in the Arctic Borderlands monitoring initiative concerned with the effects of global warming on the arctic ecosystems.

Woodland Caribou *(Rangifer tarandus caribou)*

1.0 Long-term Management Objectives

A formal long-term strategic management plan has not been developed for Woodland Caribou. The following interim objectives will be used until such time as a long-term plan is available:

- Develop a Provincial Boreal Woodland Caribou Recovery Strategy
- Participate with other Canadian jurisdictions as a member of the National Boreal Caribou Technical Steering Committee in developing a national boreal caribou recovery plan.

2.0 Population Status

2.1 Provincial Overview

Woodland caribou in Saskatchewan are the boreal ecotype. At the National scale, woodland caribou received a designation of "rare" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1984. The COSEWIC "rare" designation was redefined as "vulnerable" in 1995. The "vulnerable" designation was upgraded to "threatened in May 2000 by COSEWIC, which placed woodland caribou under the purview of the Recovery of Nationally Endangered Wildlife (RENEW) program. The change in designation to "vulnerable" was a consequence of reported declines in numbers and distribution of woodland caribou throughout most of their range due to habitat loss and fragmentation, human related disturbance, increased predation, and the sensitivity of woodland caribou to those factors due to their low reproductive rate.

At the provincial scale, Godwin and Thorpe (2000) reviewed the status of woodland caribou. They estimated the provincial mid-1990s population to be about 5,000 animals, and recommended a provincial designation of "threatened" for woodland caribou in Saskatchewan on the basis of:

1. Observed elimination of individual woodland caribou bands due to their sedentary nature.
2. Indication of population declines in the mid-boreal ecoregion concurrent with logging, mining and associated road development.
3. Planned expansion of the forest industry under current government policy.

In October 2001, Saskatchewan initiated woodland caribou recovery planning by organizing a Provincial Woodland Caribou Management Team (WCMT) composed of representatives from industry, First Nations, government and interest groups. The WCMT first met in January 2002. A Woodland Caribou Technical Working Group (WCTWG) was chosen from the WCMT in March 2002. At the direction of the WCMT, the WCTWG is responsible for drafting a woodland caribou recovery plan for review and endorsement by the WCMT. Once complete, the woodland caribou recovery plan and recommendations will be presented to the Minister of Saskatchewan Environment for consideration.

In December 2003 a status assessment and management framework (Arsenault 2003) was produced for the WCMT and WCTWG to guide development of a provincial caribou recovery strategy.

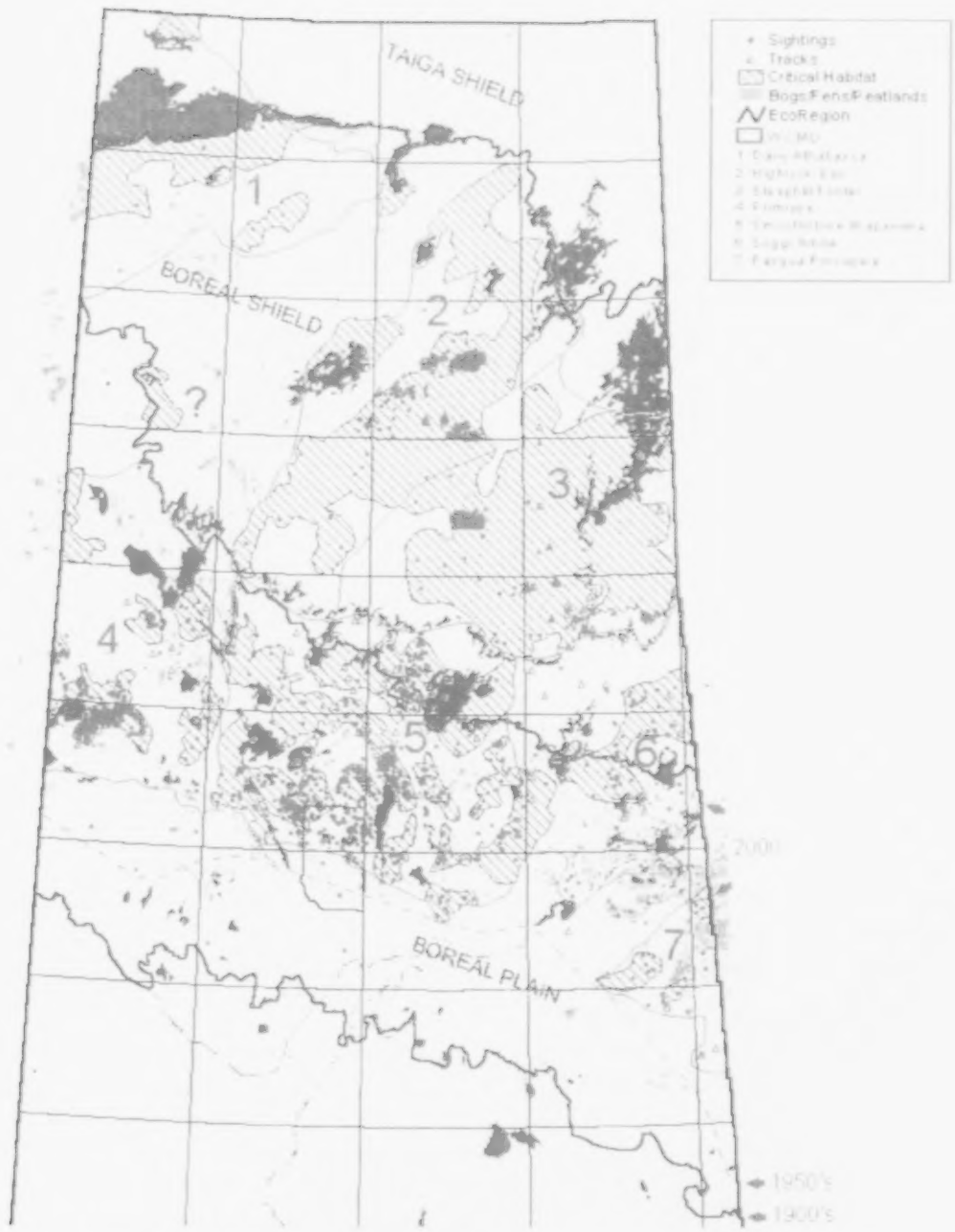

Figure 1. Woodland caribou management units (WCMUs) as defined by observational data from various sources and traditional knowledge. Arrows indicate probable southern extent of range and range contraction. Hatched areas indicate potential critical habitat areas and core range.

Note: Much of the data presented for the Primrose WCMU is caribou telemetry data provided courtesy of a data usage licensing agreement (20 Dec. 2001) between Sask. Environment and the Boreal Caribou Research Program.

2.2 Survey Data

Woodland Caribou meta-population distributions were identified using all available observational data obtained from several sources (incidental sightings from ungulate aerial surveys, woodland caribou population surveys, tracks/sightings observations survey (Trottier 1988), and traditional knowledge (Dorion and Hiebert 2002). Table 1 summarizes estimated size of woodland caribou meta-populations in relation to range, based on interpolation from limited survey data.

Table 1. Summary of woodland caribou status by management unit.

Woodland Caribou Management Unit (WCMU)	Range Area (km²)	Survey Year	Survey Area (km²)	Geographic Area	Population Density (#/km²)	Source	Estimated Population Size
Davy - Athabasca	31,870	---	---	West Athabasca Plain ecogregion	0.008	Godwin and Thorpe (2000)	240 [a]
Highrock - Key	43,611	1979	9,000	Key Lake	0.030	Beak Consultants Ltd. (1979)	1,788 [b]
		1987	697	Cigar Lake	0.030	Beak Assoc. Consulting Ltd. (1988)	
		Jan 1988	2,380	Key Lake	0.043	Brewster (1988)	
		1988	1,656	Island Falls – Points North	0.033	Beak Assoc. Consulting Ltd. (1989)	
		Jan 1992	2,380	Key Lake	0.039	Trottier (1994)	
Steephill - Foster	42,194	1988	1,656	Island Falls – Points North	0.033	Beak Assoc. Consulting Ltd. (1989)	1,392 [c]
Primrose	32,225	---	---	Primrose WCMU	0.011	Godwin and Thorpe (2000)	350 [a]
Smoothstone - Wapaweka	48,870	1960		West La Ronge	0.045	Ruttan (1960)	350 [a]
		Dec 1986	2,400	Weyakwin	0.024	Rock (1988)	
		Jan 1987	718	Sled Lake	0.038	Rock (1992)	
Suggi - Amisk	24,872	Jan 1987	1,080	Hanson Lake	0.050	Rock (1992)	100 [a]
		Jan 1987	920	Attiti Lake	0.059	Rock (1992)	
Pasquia - Porcupine	6,825	---	---	Pasquia-Porcupine WCMU	0.003	Godwin and Thorpe (2000)	30 [a]
WCMU Total	230,467						4,250

[a] Godwin and Thorpe (2000) estimates for mid 1990s.
[b] Range area x 0.041 caribou / km²
[c] Range area x 0.033 caribou / km²

2.3 Biological Sample Collections

There were no biological samples collected in 2002 or 2003.

2.4 Mortality

2.4.1 License Sales and Harvest

The regulated harvest of this species was closed province–wide in 1987 due to concerns of declining populations.

2.4.2 Subsistence Harvest

Subsistence harvest still occurs with this species but the magnitude is not known.

3.0 Management Strategies

- Management strategies are being developed through the recovery planning process at both the provincial and national levels.

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Pronghorn *(Antilocapra americana)*

1.0 Long-term Management Objectives

- Maintain the core (WMZs 2 – 13) fall (pre-hunt) population near it's long-term mean size of 17,500±10% antelope.
- Maintain the fall (pre-hunt) core herd structure near it's long-term mean of 46 Bucks/100 Does/55 Kids.
- Maintain 52,522 km² of core range (WMZs 2 – 13).

2.0 Population Status

2.1 Provincial Overview

Based on aerial survey data and population modeling, the provincial pronghorn population during fall 2003 was estimated to be 22,861. The core (WMZs 2 – 13) pronghorn population was estimated to be 21,611 (Figure 1). Pronghorn management units (PMUs) are illustrated in Figure 2.

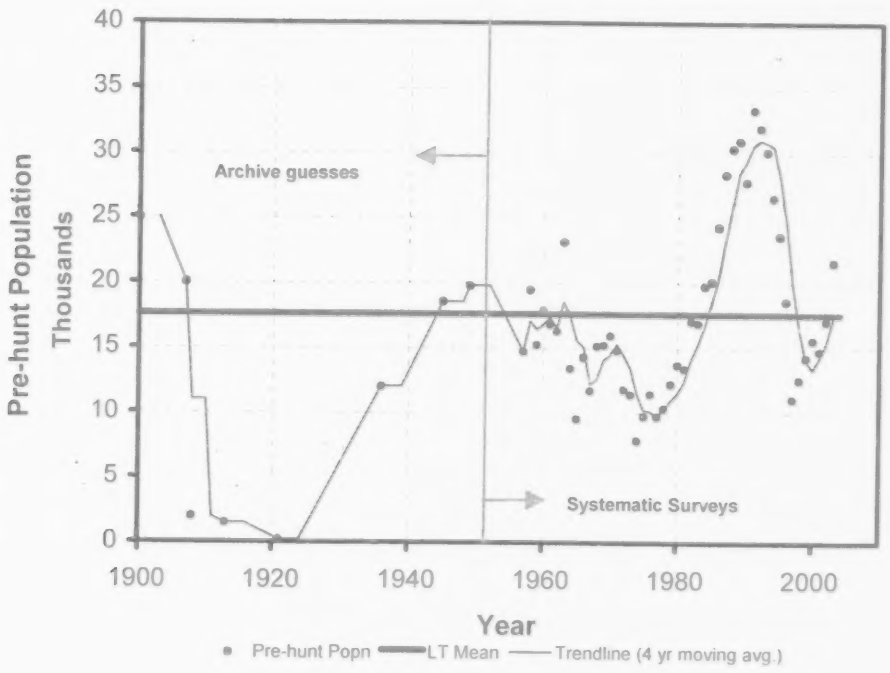

Figure 1. Estimated core range (WMZ 2-13) pronghorn fall population in relation to long-term mean.

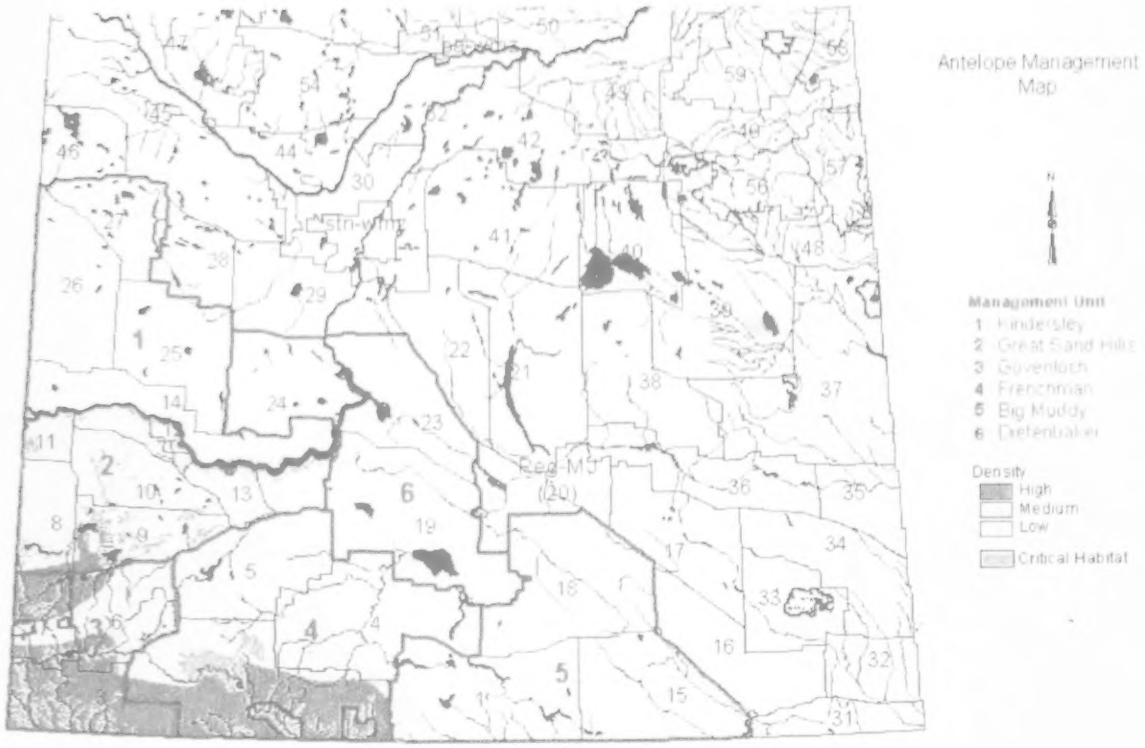

Figure 2. Pronghorn management units (PMUs).

2.2 Survey Data

Table 1 summarizes current population size and structure in relation to long-term averages based on model interpolation from survey data (Tables 2 and 3).

The fall 2003 provincial pronghorn population estimate (22,861 animals) was 9% above the long-term population objective of 21,000 animals (Table 1). The adult segments of the population exceed their long-term objectives, particularly in the core range PMUs (ie. Govenlock and Frenchman). The low kid survival in 2002 (Tables 3 and 4) was attributed primarily to inclement weather conditions (snow) during parturition, which likely caused significant kid mortality. Kid production and survival in 2003 was above the long term average (Table 4).

Table 1. Fall (pre-hunt) pronghorn population size, structure, and density estimates based on aerial surveys, 2002 and 2003.

Pronghorn Management Unit (PMU)	WMZs	Year	Estimated Fall Population Size				PMU Density (#/km²)	Fall Population Structure		
			Bucks	Does	Kids	Total		Bucks/ 100 Does	Kids/ 100 Does	n
CORE										
Govenlock (11,608 km²)	3, 6, 7	2002	1,708	3,667	473	5,848	0.504	47	13	767
		2003	1,713	3,662	2,156	7,531	0.649	47	59	545
		Mean (1964-2003)	1,303	2,858	1,429	5,590	0.481	46	50	--
Frenchman (24,792 km²)	2, 4, 5	2002	2,332	4,845	503	7,679	0.310	48	10	382
		2003	2,288	4,889	2,878	10,054	0.406	47	59	--
		Mean (1964-2003)	1,718	3,408	1,675	6,801	0.207	50	49	--
G. Sand Hills (16,122 km²)	8 - 13	2002 [a]	780	2,361	414	3,555	0.221	33	18	369
		2003 [a]	1,080	1,816	1,130	4,026	0.250	59	62	481
		Long-term Objective [b]	1,118	2,192	1,556	4,866	0.302	51	71	--
Core Range (52,522 km²)	2 -13	2002	4,820	10,872	1,390	17,082	0.325	44	13	1,518
		2003	5,081	10,367	6,163	21,611	0.411	52	60	1,026
		Mean (1964-2003)	4,291	8,846	4,570	17,707	0.337	49	52	--
FRINGE										
Big Muddy (23,391 km²)	1, 15, 18	2002 [c]	--	--	--	500	0.021	--	--	--
		2003 [c]	--	--	--	500	0.021	--	--	--
		Long-term Objective [b]	324	636	451	1,411	0.060	51	71	--
Kindersley (22,356 km²)	14, 25-27	2002 [c]	--	--	--	500	0.022	--	--	--
		2003 [c]	--	--	--	500	0.022	--	--	--
		Long-term Objective [b]	291	570	405	1,265	0.057	51	71	--
Diefenbaker (19,974 km²)	19, 23, 24	2002 [c]	--	--	--	250	0.013	--	--	--
		2003 [c]	--	--	--	250	0.013	--	--	--
		Long-term Objective [b]	134	262	186	582	0.029	51	71	--
Fringe Range (65,721 km²)	1, 14,15, 19,23-27	2002 [c]	--	--	--	1,250	0.019	--	--	--
		2003 [c]	--	--	--	1,250	0.019	--	--	--
		Long-term Objective [b]	749	1,468	1,042	3,259	0.050	51	71	--

[a] projected from partial survey of PMU
[b] per Killaby et al. (1992)
[c] best guess estimate based on field reports

Table 2. Summary of adult pronghorn population density survey results (surveys were conducted during late May/early June), 2002–2004.

Pronghorn Management Unit (PMU)	WMZs	PMU Area (km²)	Survey Area (km²)		Survey Density (Adult Pronghorn/km² ± 90% CI) 2002	2003	2004
CORE [a]							
Govenlock	3, 6, 7	11,608	10,480		0.50 ±24.8%	ns	ns
Frenchman	2, 4, 5	24,792	10,656	(Primarily WMZ 2)	0.48 ±22.9%	ns	ns
G. Sand Hills	8 - 13	16,122	7,120	(Primarily WMZs 8 & 9, and portions of adjacent WMZs)	0.44 ±19.8%	0.41 ±23.2%	ns
FRINGE [b]							
Big Muddy	1, 15, 16	23,391	0		ns	ns	ns
Kindersley	14, 25-27	22,356	0		ns	ns	ns
Diefenbaker	19, 23, 24	19,974	0		ns	ns	ns

[a] "Core" refers to the populations found in the 1990 range defined by Killaby et al. (1992).
[b] Occurrence of "fringe" populations is considered to be strongly influenced by winter severity.

Table 3. Number of pronghorn in each sex and age class by management unit, based on aerial surveys conducted in July, 2002-2004.

Pronghorn Management Unit (PMU)	Survey Date	Sample Size: Yearling Bucks	Mature Bucks	Does	Kids	Total	Population Structure: Buck / Doe Ratio	Kid / Doe Ratio
Govenlock	9-11 July 2002	43	181	481	62	767	0.47	0.13
	25-26 June 2003	4	120	265	156	545	0.47	0.59
	5 July 2004	69	225	493	165	952	0.60	0.34
Frenchman	9-11 July 2002	21	95	241	25	382	0.48	0.10
	2003	ns	ns	ns	ns	ns	ns	ns
	5 July 2004	36	37	142	44	259	0.51	0.31
G Sandhills	2002	ns	ns	ns	ns	ns	ns	ns
	25-26 June 2003	19	110	217	135	481	0.59	0.62
	5 July 2004	41	77	272	112	502	0.84	0.41

ns = no survey

Table 4. Summary of provincial fall (pre-season) pronghorn population structure, 1960-2004.

Year	Population Structure Sample Size				Buck:Doe	Kid:Doe
	Bucks	Does	Kids	n	Ratio	Ratio
1960	208	362	283	853	0.575	0.782
1961	359	605	470	1,434	0.593	0.777
1962	205	215	216	636	0.953	1.005
1963	696	800	859	2,355	0.870	1.074
1964	505	723	461	1,689	0.699	0.638
1965	512	968	528	2,008	0.529	0.545
1966	832	1,682	1,424	3,938	0.495	0.847
1967	678	1,078	882	2,638	0.629	0.818
1968	902	1,694	1,258	3,854	0.532	0.743
1969	972	1,658	1,438	4,068	0.586	0.867
1970	1,188	1,778	1,374	4,340	0.668	0.773
1971	828	1,706	1,204	3,738	0.485	0.706
1972	648	1,468	1,036	3,152	0.441	0.706
1973	869	2,156	1,368	4,393	0.403	0.635
1974	844	1,970	1,082	3,896	0.428	0.549
1975	462	1,099	692	2,253	0.420	0.630
1976	498	1,106	896	2,500	0.450	0.810
1977	459	1,044	668	2,171	0.440	0.640
1978	424	1,009	697	2,130	0.420	0.691
1979	393	820	738	1,951	0.479	0.900
1980	449	936	758	2,143	0.480	0.810
1981	538	1,239	841	2,618	0.434	0.679
1982	680	1,721	881	3,282	0.395	0.512
1983	707	1,442	1,120	3,269	0.490	0.777
1984	931	1,607	892	3,430	0.579	0.555
1985	259	571	394	1,224	0.454	0.690
1986	131	221	186	538	0.593	0.842
1987	456	712	686	1,854	0.640	0.963
1988	660	1,262	826	2,748	0.523	0.655
1989	830	1,469	943	3,242	0.565	0.642
1990	310	587	360	1,257	0.528	0.613
1991	490	968	360	1,818	0.506	0.372
1992	382	962	202	1,546	0.397	0.210
1993	321	1,042	350	1,713	0.308	0.336
1994	261	584	203	1,048	0.447	0.348
1995	237	682	122	1,041	0.348	0.179
1996	180	605	168	953	0.298	0.278
1997	125	473	124	722	0.264	0.262
1998	189	435	130	754	0.434	0.299
1999	63	208	63	334	0.303	0.303
2000	210	490	170	870	0.429	0.347
2001	342	709	185	1,236	0.482	0.261
2002	340	722	87	1,149	0.471	0.120
2003	253	483	291	1,026	0.524	0.602
2004	485	907	321	1,713	0.535	0.354
Mean (1960-2004)					0.504	0.544

2.3 Biological Sample Collections

There were no biological samples collected for this species in 2002 or 2003.

2.4 Mortality

2.4.1 License Sales

Table 5. Summary of provincial pronghorn license sales and harvest, 1980-2003.

Hunt Year	Licenses Issued					Antelope Harvest					Hunter-days	Hunter-Days/ Animal
	Either-sex	Bucks-only	Archery	Antlerless	Total	Bucks	Does	Kids	Unkn	Total		
1980	2,244	--	141	--	2,385	935	601	134	0	1,670	3,515	2.10
1981	2,395	--	150	--	2,545	1,193	667	113	0	1,973	3,753	1.90
1982	2,554	--	200	--	2,754	1,207	729	176	0	2,112	3,920	1.86
1983	2,411	--	260	--	2,671	1,181	714	173	0	2,068	3,955	1.91
1984	2,717	--	298	--	3,015	1,206	693	132	0	2,031	4,315	2.12
1985	2,921	--	260	--	3,181	1,073	550	94	0	1,717	5,596	3.26
1986	2,983	--	296	--	3,279	1,672	712	149	0	2,533	6,282	2.48
1987	3,461	--	252	--	3,713	1,958	855	137	0	2,950	6,188	2.10
1988	4,339	--	301	--	4,640	2,586	972	204	0	3,762	9,240	2.46
1989	5,047	--	344	--	5,391	3,659	618	130	0	4,407	10,883	2.47
1990	6,429	--	331	--	6,760	3,804	1,545	216	2	5,567	12,589	2.26
1991	5,043	--	376	3,780	9,199	3,169	3,783	701	6	7,659	29,916	3.91
1992	5,200	--	446	7,406	13,052	2,787	4,410	881	71	8,149	22,897	2.81
1993	6,454 [a]	--	--	4,451	10,905	2,917	3,260	508	4	6,689	23,994	3.59
1994	5,598 [a]	--	--	--	5,598	1,810	1,210	182	0	3,202	12,303	3.84
1995	3,490 [a]	--	--	--	3,490	1,408	692	87	0	2,187	8,610	3.94
1996	2,419 [a]	--	--	--	2,419	1,081	540	61	0	1,682	5,489	3.26
1997	--	--	--	--	0	--	Season	Closed	--	0	--	--
1998	--	--	--	--	0	--	Season	Closed	--	0	--	--
1999	--	--	--	--	0	--	Season	Closed	--	0	--	--
2000	--	--	--	--	0	--	Season	Closed	--	0	--	--
2001	--	--	--	--	0	--	Season	Closed	--	0	--	--
2002	--	350	--	--	350	322	0	0	0	322	768	2.39
2003	--	502	--	--	502	450	0	0	8	458	1,142	2.49

[a] one license for "archery, rifle and muzzleloader", prior to 1993 the either-sex license was for "rifle and muzzleloader only".

2.4.2 Hunting Activity and Harvest

See Table 5 for summary of annual harvest (1980 to present).

2.4.3 Other Mortality Factors

Pronghorn numbers have been gradually recovering throughout their range since the late 1990's. In Saskatchewan, this was attributed to improved range conditions, reduced coyote predation of pronghorn kids and elimination of hunting pressure from 1997 through 2001. With the exception of 2002, kid production and survival had improved in recent years. This coupled with good adult survival

has allowed populations in Saskatchewan to recover to a level where licensed hunting season (bucks-only) was reopened in 2002, with slightly expanded quotas in 2003.

3.0 Management Strategies

- Monitor pronghorn population size and structure in core range, so any changes can be readily detected, and so the number of surplus animals can be calculated.
- Switch to either-sex seasons throughout core pronghorn range, with quotas determined through population surveys.
- Continue communication with other jurisdictions to monitor population changes on pronghorn range.

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Plains Bison *(Bison bison bison)*

1.0 Long-term Management Objectives

A formal long-term strategic management plan, or recovery plan has not been developed for plains bison. Saskatchewan Environment recognizes the importance of plains bison as part of the wildlife diversity of Saskatchewan, and the importance of our free ranging bison to the national status and conservation of this species.

2.0 Population Status

Plains bison are one of two extant bison subspecies, the other being Wood Bison. Bison were once the dominant herbivore of the Great Plains ecosystem (Boyd 2003). Plains Bison were extirpated from Saskatchewan in the late 1800s, and then reintroduced in 1969. They currently have a national status of "Threatened" (COSEWIC, May 2004), which means this is a species likely to become endangered if limiting factors are not reversed. Bison ranchers in Canada successfully lobbied the federal government from listing Plains Bison under the Species At Risk Act (SARA) because of a perceived negative impact to the bison ranching industry, but the sub-species is still listed as "Threatened" by COSEWIC.

There are currently about 700 mature Plains Bison in 3 free-ranging herds in Canada (COSEWIC 2004, Figure 1). Two of the free-ranging populations (n= 400 bison) currently reside in Saskatchewan and are considered to be "at risk" due to habitat loss. The 2 free-ranging plains bison populations in Saskatchewan originated from Elk Island National Park (EINP). EINP had a large number of founders, and consequently is one of the most diverse plains bison populations in North America (Wilson and Strobeck 1999). There are also 2 captive Plains Bison conservation populations in Saskatchewan, which also originated from EINP.

2.1 Free-ranging Wild Populations

Both of Saskatchewan's free-ranging wild Plains Bison populations originate from an attempt, in January 1969 by Saskatchewan Department of Natural Resources (DNR), to reintroduce the sub-species into the Thunder Hills region. The release site was at Two Forks River near Neyakamew Lake (about 60 km north of Prince Albert National Park. When the founding population of 50 Plains Bison (14 bulls and 36 cows, all < 5 years of age) were released, the animals moved to the south side of Prince Albert National Park (PANP). The animals caused some agricultural damage for local landowners, which resulted in an attempt by DNR to capture and relocate them to various sites (Cumberland House-Red Earth, Vermette-Upper Cummings Lakes, 165 mile cut-off on the Hanson Lake Road, and Highway #2 at Two Forks River). The Cumberland House-Red Earth population was eradicated by hunting. A few animals remained in the PANP area (n= 16-22), establishing a range along the Sturgeon River Valley, which runs along the southwest edge of PANP (Bergeson 1990). They are called the Sturgeon River Population. The Vermette-Upper Cummings Lake animals (n = 10 -17) established a range in the McCuster River area inside the Primrose Air Weapons Range and are called the McCuster River Population.

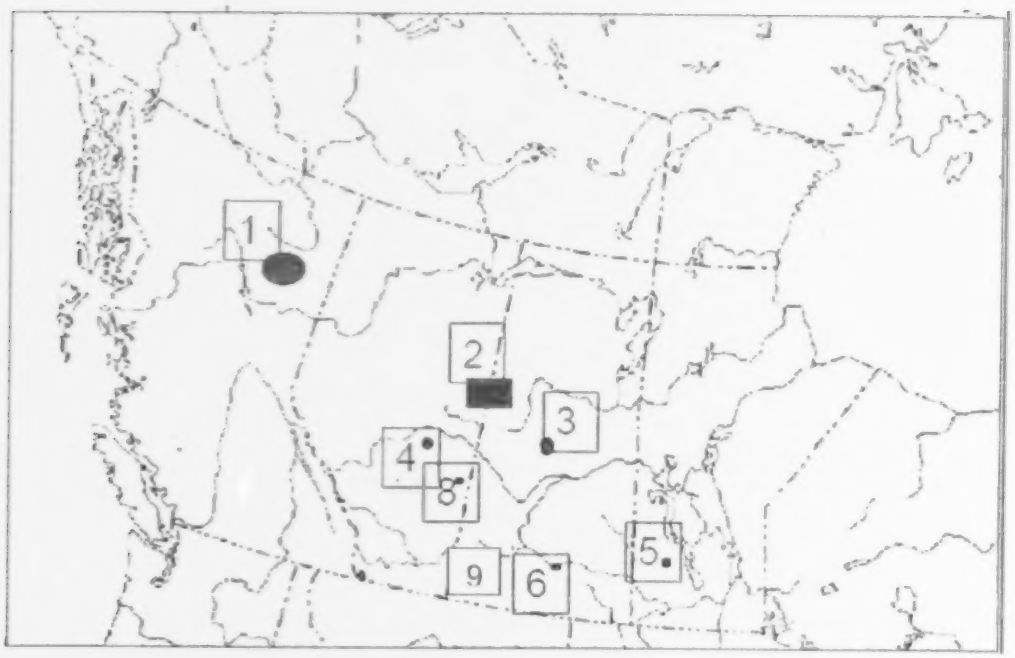

Figure 1. Current locations of publicly owned Canadian Plains Bison populations (adapted from Figure 3 in COSEWIC 2004). (1) Pink Mountain [a], (2) McCuster River [a], (3) Sturgeon River [a], (4) Elk Island National Park [b], (5) Riding Mountain National Park [c], (6) Buffalo Pound Provincial Park [c], (7) Waterton Lakes National Park [c], (8) Bud Cotton Buffalo Paddock [c], (9) Old-Man-On-His-Back Prairie and Heritage Conservation Area [c].
[a] wild populations, [b] semi-wild populations, [c] captive populations.

2.1.1 Sturgeon River (Prince Albert National Park) Population

Plains bison historically existed throughout the Prince Albert National Park (PANP) region until they were extirpated in the late 1800s (COSEWIC 2004). The Sturgeon River Plains Bison are only herd of free-ranging Plains bison located on historical range in Canada. In 1986 the population was reported to consist of 6 bulls, 6 cows, 3 calves, and 5 unknown, totaling at least 20 bison. In 2002, the population was reported to consist of at least 320 bison (269 adults and 51 calves) with an increasing population trend (COSEWIC 2004). Current range is about 750 km^2 in size, most of which lies within PANP.

From 1936 through 1995 there was also a captive display herd in PANP. Eight of these animals were dispersed to First Nations and 12 were sold to cover the costs of rehabilitating the bison paddocks. This allowed PANP to refocus resources on managing the free ranging herd.

2.1.2 McCuster River (Primrose-Cold Lake) Population

In 1982 this population was estimated to be 25-30 animals. By 2003, the population had grown to an estimated 80-100 bison with an increasing population trend (Boyd 2003). The size of the herd range is estimated to be 500–750 km^2 in area (COSEWIC 2004). This free-ranging herd resides primarily on the Saskatchewan side of the Primrose/Cold Lake Air Weapons Range (COSEWIC 2004), and are outside of their historic range.

2.2 Captive Conservation Populations

2.2.1 Buffalo Pound Provincial Park

This captive display herd was established in February 1972 for educational and display purposes. The founding herd was comprised of 8 cows and 4 bulls from EINP. In 2003, the population consisted of 3 bulls and 32 cows and calves. Since 1972, the population has been periodically augmented from other captive conservation bison herds (2 bulls in 1988, 2 cows in 1990, 1 bull in 1991, 3 bulls in 1997, 1 bull in 1999, and 1 bull in 2000).

2.2.2 Old-Man-On-His-Back Prairie and Heritage Conservation Area

The Nature Conservancy of Canada (NCC) acquired the 5,302 ha Old-Man-On-His-Back Prairie (OMB) as a heritage conservation area in 1996. In December 2003, 50 calves and yearlings from EINP were introduced to the 53 km^2 OMB (COSEWIC 2004). This fenced preserve has a grazing capacity of about 250 adult bison.

2.3 Limiting Factors

There are several limiting factors that could negatively alter the status of plains bison. These include:

- Lack of habitat – most of the original plains bison range in Saskatchewan has been lost to agriculture and development, thus limiting the amount of available habitat and conservation options. Large-scale disturbances to the ranges of either free-ranging population could make this subspecies vulnerable to extirpation.
- Disease – Bison are susceptible to numerous pathogens and parasites, which can negatively impact on population viability, or if infected, cause a potential threat to adjacent commercial livestock or people.
- Genetic Diversity – the severe population decline of the 19th century created a severe demographic bottleneck, which could have reduced genetic diversity and increased potential for genetic drift and inbreeding within and among the remnant small founder populations.
- Genetic hybridization (incidental or artificial) - with cattle, wood bison and/or ranched bison can compromise genetic integrity of the plains bison subspecies.
- Hunting - the McCuster River (Primrose-Cold Lake) Population is subject to hunting mortality by local First Nations, and the PANP population can be shot on private land when they stray from the PANP and Crown land portions of their range. Under the Saskatchewan Wildlife Act (1998), bison are listed as a big game species, and are therefore considered as wildlife. There is no licensed hunting season for bison, therefore they are protected from hunting by non-aboriginals.
- Game Ranching – at least 95% of bison in Canada exist on game ranches (Boyd 2003). The biggest threat to conservation of plains bison within the ranched population is genetic pollution and loss of genetic diversity through selective breeding and artificial selection for preferred traits (eg. faster growing, more docile, leaner meat) (COSEWIC 2004). Also, mixing of ranched and wild populations as a result of escaped commercial bison, would result in dilution or potential replacement of traits that exist in wild bison as a product of natural selection.(COSEWIC 2004).

3.0 Management Strategies

- Support recovery efforts within a planned recovery framework by developing a provincial recovery plan linked to a national recovery plan.
- Support current recovery initiatives to create captive conservation herds of genetically pure plains bison to Grasslands National Park (part of Parks Canada's management plan), and Old-Man-On-His-Back-Prairie (Nature Conservancy of Canada project).
- Monitor the size, demographics, and population trend of free-ranging populations to identify population fluctuations, for Population Viability Analysis (PVA), for recovery planning, and to determine population objectives.
- Because of the vulnerability of small remnant free-ranging populations to stochastic events, high priority should be given to identification of suitable areas for establishment of new populations.

4.0 Literature Cited

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Black Bear *(Ursus americanus)*

1.0 Long-term Management Objectives

- Maintain stable winter populations of black bears throughout their range, to attain a provincial population of 24,000 – 40,000 bears.
- Maintain 469,000 km² of occupied black bear habitat.

2.0 Population Status

2.1 Provincial Overview

Black Bear range is illustrated in Figure 1. Black bears in Saskatchewan have a dual harvest management designation as a fur-bearer (in Fur Conservation Areas), and as a big game species (licensed hunting seasons). International concerns over the status of bear populations (other than North America) led to the black bear being added to the CITES II listing under the "look-a-like" clause in 1992.

2.2 Survey Data / Population Indicators

Direct survey data are not collected for this species, but population indicators are used to assess changes in population status relative to other years.

2.2.1 Hunter Success and Effort

In years where **hunter success** is greater, and **hunter effort** (hunter-days/bear) is lower than for previous year(s), the population can be considered to be growing. Over the past 2 years resident hunter success has been lower and hunter effort has increased relative to the 10-year mean (Table 1). Over the same period non-resident hunter success and effort have been similar to the 10- year average (Table 1). These indices suggest the provincial population may have slightly declined in size relative to previous years.

2.2.2 Mean Age of Harvested Females

Female bears become reproductively active at 4 - 6 years of age, and tend to produce offspring every second year. Since black bears have a low reproductive potential, it is necessary to maintain a sufficient number of females of reproductive age in the population. The mean age for female bears harvested during the past several years fell within the traditional breeding age ranges (Table 2). However, age data for 2002 and 2003 was not available for an adequate population assessment using this index.

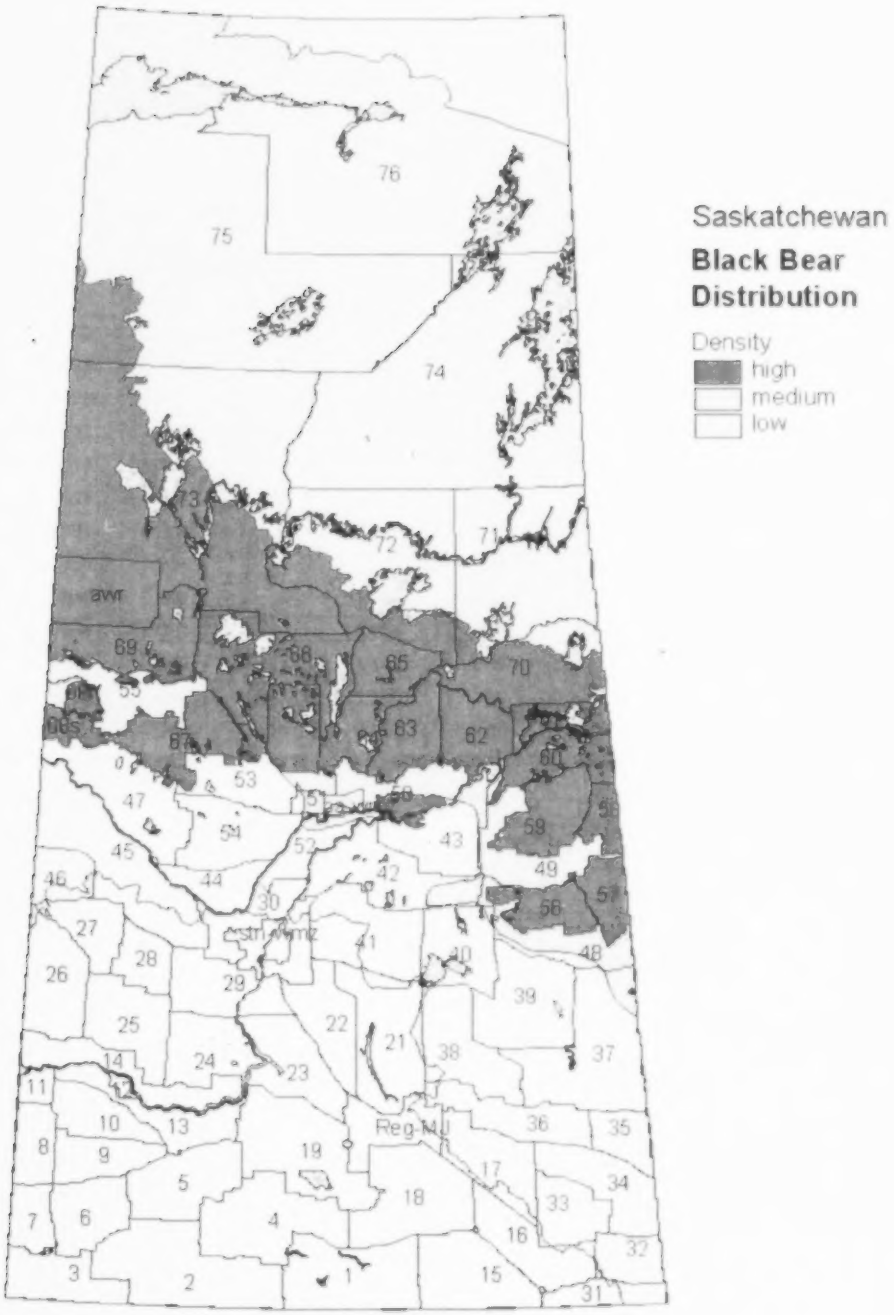

Figure 1. Black bear range.

Figure 1 Black bear range

Table 1. Summary of annual hunter success and hunter effort for resident and guided hunters, 1984-2003.

	Resident Hunters		Non-resident (Guided) Hunters	
Hunt Year	Hunter Success (%)	Hunter-days/ bear	Hunter Success (%)	Hunter-days/ bear
1984	43	6.0	na	na
1985	20	20.0	na	na
1986	37	10.8	na	na
1987	34	12.2	na	na
1988	29	14.8	na	na
1989	28	17.8	na	na
1990	24	12.8	na	na
1991	27	11.8	na	na
1992	36	9.8	86	4.8
1993	37	12.4	81	4.7
1994	24	14.3	67	5.1
1995	36	11.7	68	5.4
1996	38	11.5	76	4.8
1997	41	12.3	78	4.3
1998	34	12.9	79	4.8
1999	26	17.7	73	5.2
2000	27	17.0	72	5.5
2001	28	15.9	70	5.8
2002	28	17.6	73	5.6
2003	26	19.6	76	5.2
10-yr Mean	31	14.7	72	5.3

Table 2. Average age of male and female black bears harvested in Saskatchewan, 1986 – 2003.

	Male Age		Female Age	
Hunt Year	Mean	n	Mean	n
1986	4.48	31	5.50	31
1987	4.70	53	5.56	34
1988	5.03	92	4.18	51
1989	4.00	233	4.97	179
1990	3.91	172	4.77	92
1991	3.91	186	4.51	71
1992	5.01	261	6.01	139
1993	4.63	306	5.96	166
1994	4.52	310	6.31	177
1995	4.93	406	6.82	191
1996	4.87	338	5.87	168
1997	4.95	570	6.63	280
1998	5.38	613	6.45	380
1999	5.41	732	7.26	372
2000	5.38	721	7.04	381
2001	5.55	744	6.69	401
2002	Data not available			
2003	Data not available			

2.2.3 Harvest Adult Sex Ratio

Hunters select for larger bears. This affords some protection to females, which tend to be smaller than males of the same age class. The adult sex ratio **(boars/sow)** in the harvest during the past two years is slightly larger than the 10 year mean (Table 3), indicating a reduced exposure of females to hunting pressure and a slight population increase because of the proportionately larger number of males harvested.

Table 3. Harvest structure for black bears, Saskatchewan, 1986-2003.

	Licensed Harvest						
Hunt Year	Boars	Sows	Cubs	Total [a]	Boars/Sow	Cubs/Sow	Prop. (%) Cubs in Harvest
1986	1,239	547	245	2,031	2.27	0.45	12.1
1987	922	469	71	1,462	1.97	0.15	4.9
1988	976	389	68	1,433	2.51	0.17	4.7
1989	813	363	65	1,241	2.24	0.18	5.2
1990	778	301	20	1,099	2.58	0.07	1.8
1991	623	204	38	865	3.05	0.19	4.4
1992	731	255	6	922	2.87	0.02	0.7
1993	784	324	9	1,095	2.42	0.03	0.8
1994	656	302	6	964	2.17	0.02	0.6
1995	834	391	0	1,225	2.13	0.00	0.0
1996	1,130	454	34	1,618	2.49	0.07	2.1
1997	1,298	651	47	1,996	1.99	0.07	2.4
1998	1,421	755	36	2,212	1.88	0.05	1.6
1999	1,449	637	21	2,107	2.27	0.03	1.0
2000	1,521	678	21	2,220	2.24	0.03	0.9
2001	1,464	662	21	2,147	2.21	0.03	1.0
2002	1,661	633	25	2,319	2.62	0.04	1.1
2003	1,616	622	13	2,251	2.60	0.02	0.6
10-yr Mean	1,316	580	23	1,919	2.27	0.04	1.2

[a] Sample does not include bears of unknown sex.

2.2.4 Proportion of Cubs in Harvest

Another indicator of an over-exploited bear population is a marked increase in the **proportion of cubs in the harvest**. Over the past few years there has been a very low representation of cubs in the annual harvest structure (Table 3), which indicates a stable population. The vast majority of cubs in the harvest are taken during the fall hunt.

2.2.5 Color Phase Ratio

Hunters tend to select for off-colored bears. This leads to shifts in color phase ratio in the harvest, which can serve as a measure of the degree of hunting pressure on a bear population (Table 4). Increasing ratios of black:off-colored bears in the harvest would serve as an indication that the bear population is decreasing. This population indicator suggests that the bear population may have slightly decreased over the past 2 years.

Table 4. Color phase ratios for black bears harvested in Saskatchewan, 1986–2003.

Hunt Year	Black	Brown	Cinnamon	Blonde	Total	Black:Off Color
1986 [a]	na	na	na	na	74	2.89 : 1.00
1987 [a]	na	na	na	na	118	3.50 : 1.00
1988 [a]	na	na	na	na	169	5.04 : 1.00
1989 [a]	na	na	na	na	430	2.14 : 1.00
1990 [a]	na	na	na	na	272	2.20 : 1.00
1991 [a]	na	na	na	na	263	1.86 : 1.00
1992	294	138	--	--	432	2.13 : 1.00
1993	381	123	34	26	564	2.08 : 1.00
1994	362	120	42	16	540	2.03 : 1.00
1995	486	131	66	9	692	2.36 : 1.00
1996	410	118	42	22	592	2.25 : 1.00
1997	357	77	45	20	499	2.51 : 1.00
1998	876	221	84	32	1,213	2.60 : 1.00
1999	1,057	237	94	50	1,438	2.77 : 1.00
2000	1,040	231	114	54	1,439	2.61 : 1.00
2001	1,093	251	92	32	1,468	2.91 : 1.00
2002	1,088	231	94	36	1,449	3.01 : 1.00
2003	1,021	176	96	33	1,326	3.35 : 1.00

[a] unable to locate empirical data, used information reported from previous years.

2.2.6 Population Status

The population indicators do not suggest a significant change in population status from previous years, which suggests that the bear population is stable. However, the cementum age data is required to complete the assessment of population trend.

2.3 Biological Sample Collections

Table 5. Summary of cementum age classes of harvested bears, 1998-2003.

Age Class	1998		1999		2000		2001		2002		2003	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
0.5	–	–	10	2	–	–	–	–				
1+	22	9	23	5	28	12	33	10				
2+	99	53	118	37	120	39	163	58				
3+	138	69	157	56	181	85	130	58				
4+	128	63	132	67	123	57	123	53				
5+	65	42	108	47	75	32	69	55				
6+	32	25	43	22	41	21	61	31				
7+	34	16	24	12	40	25	35	26				
8+	35	26	26	23	21	10	23	19				
9+	11	18	18	23	15	15	16	15				
10+	12	14	12	15	13	18	18	16				
11+	1	3	16	13	21	13	19	11				
12+	5	6	3	5	11	17	10	10				
13+	8	6	12	5	5	4	7	11				
14+	3	5	7	4	10	4	7	1				
15+	3	3	6	6	3	5	12	8				
16+	3	7	5	6	4	3	1	3				
17+	3	1	3	4	1	–	5	5				
18+	–	6	1	1	2	4	4	1				
19+	3	2	3	2	2	2	4	3				
20+	3	3	1	6	2	4	1	3				
21+	1	1	–	3	1	–	1	1				
22+	2	–	1	2	–	1	–	–				
23+	1	–	2	3	–	–	–	2				
24+	–	1	–	–	–	1	–	–				
25+	–	–	–	2	2	2	–	–				
26+	–	–	–	–	–	1	–	–				
27+	1	–	1	–	–	2	1	–				
28+	–	1	–	–	–	1	–	–				
29+	–	–	–	1	–	2	–	1				
30+	–	–	–	–	–	–	–	–				
31+	–	–	–	–	–	–	–	–				
32+	–	–	–	–	–	–	–	–				
33+	–	–	–	–	–	1	–	–				
34+	–	–	–	–	–	–	1	–				
n =	613	380	732	372	721	381	744	401	na	na	na	na
Mean Age	5.38	6.45	5.41	7.26	5.38	7.04	5.55	6.70	na	na	na	na

na = data not available yet

2.4 Mortality

2.4.1 License Sales

Table 6. Summary of provincial black bear license sales, 1980-2003.

Hunt Year	1st License			2nd License			Total License Sales	Free Fall Permits (WMZ 58-61)
	Sask. Resident	Can. Resident	Non Resident	Sask. Resident	Can. Resident	Non Resident		
1980	4,920	?	?	?	?	?	5,440	--
1981	3,602	?	?	?	?	?	3,873	--
1982	3,611	?	?	?	?	?	4,024	--
1983	?	?	?	?	?	?	4,375	--
1984	?	?	?	?	?	?	4,899	3,170
1985	3,601	67	380	319	3	22	4,392	3,142
1986	4,303	95	634	460	6	115	5,613	2,489
1987	3,817	92	891	393	12	123	5,328	2,375
1988	3,353	95	1,162	284	7	244	5,145	--
1989	2,903	70	906	--	--	--	3,879	--
1990	2,539	75	776	--	--	--	3,390	--
1991	1,740	49	701	--	--	--	2,490	--
1992	1,685	71	802	--	--	--	2,558	--
1993	1,758	76	1,140	--	--	--	2,974	--
1994	1,848	68	1,436	--	--	--	3,352	--
1995	1,492	36	1,477	--	--	--	3,005	--
1996	1,809	63	1,601	--	--	--	3,473	--
1997	1,821	70	1,788	--	--	--	3,679	--
1998	2,262	74	1,888	--	--	--	4,224	--
1999	1,908	77	2,375	--	--	--	4,360	--
2000	1,928	96	2,412	--	--	--	4,436	--
2001	1,809	86	2,405	--	--	--	4,300	--
2002	1,928	107	2,485	--	--	--	4,520	--
2003	1,856	119	2,357	--	--	--	4,332	--
10-yr (1994-03) Mean	1,866	80	2,022	--	--	--	3,968	--

2.4.2 Hunting Activity and Harvest

There are no data to assess subsistence hunting activity or harvest. Table 7 summarizes harvest by Saskatchewan resident licensed hunters. There are no data to assess Canadian resident hunting activity or harvest. Table 8 summarizes harvest and hunting activities by guided (non-resident) hunters. Table 9 summarizes total annual licensed harvest of bears.

2.4.3 Nuisance Bears

No estimates are available for number of problem bears that were destroyed.

Table 7. Provincial black bear harvest by resident hunters, 2003 compared to the previous year and 10-yr (1994–2003) mean, (see Big Game Hunter Harvest Survey Statistics for summaries of hunting activity and harvest statistics by season and WMZ).

Season and Ecozone	Hunt Year	Zone Hunters	Harvest					Hunter Success (%)	Hunter-days	Hunter-days/ Bear
			Boars	Sows	Cubs	Unkn	Total			
SPRING										
Parkland	2002	212	47	24	8	0	79	37.3	928	11.7
(WMZs 35-47)	2003	158	53	12	0	0	65	41.1	921	14.2
	10-yr (1994-03) Mean	144	39	15	2	0	56	38.6	683	12.3
Forest Fringe	2002	440	110	31	0	0	141	32.0	1,958	13.9
(WMZs 48-55)	2003	364	82	18	0	0	100	27.5	2,182	21.8
	10-yr (1994-03) Mean	370	82	24	5	1	113	30.4	1,624	14.4
Forest	2002	763	134	16	8	0	158	20.7	3,790	24.0
(WMZs 56-73)	2003	698	158	29	0	0	187	26.8	3,467	18.5
	10-yr (1994-03) Mean	795	187	55	1	3	246	30.9	3,612	14.7
Shield	2002	24	8	0	0	0	8	33.3	110	13.8
(WMZs 74-76)	2003	47	12	0	0	0	12	25.5	164	13.7
	10-yr (1994-03) Mean	21	6	1	0	0	7	33.0	77	11.3
SPRING TOTAL	2002	1,439	299	71	16	0	386	26.8	6,786	17.6
	2003	1,267	305	59	0	0	364	28.7	6,734	18.5
	10-yr (1994-03) Mean	1,329	314	94	8	4	421	31.7	5,997	14.3
FALL										
Parkland	2002	94	39	8	0	0	47	50.0	558	11.9
(WMZs 35-47)	2003	82	18	0	0	0	18	22.0	370	20.6
	10-yr (1994-03) Mean	78	17	2	2	0	22	27.8	323	14.9
Forest Fringe	2002	204	39	16	0	0	55	27.0	723	13.2
(WMZs 48-55)	2003	264	18	6	6	0	30	11.4	1,167	38.9
	10-yr (1994-03) Mean	240	34	17	4	0	56	23.2	887	16.0
Forest	2002	377	39	0	8	0	47	12.5	1,344	28.6
(WMZs 56-73)	2003	293	65	6	0	0	71	24.2	1,062	15.0
	10-yr (1994-03) Mean	321	49	15	4	2	70	21.8	1,148	16.4
Shield	2002	8	0	0	0	0	0	0.0	24	---
(WMZs 74-76)	2003	18	0	0	0	0	0	0.0	117	---
	10-yr (1994-03) Mean	10	2	0	0	1	3	24.3	45	17.9
FALL TOTAL	2002	683	117	24	8	0	149	21.8	2,649	17.8
	2003	657	101	12	6	0	119	18.1	2,716	22.8
	10-yr (1994-03) Mean	649	102	35	10	3	150	23.1	2,403	16.0

Table 8. Provincial black bear harvest by non-resident (guided) hunters in 2003 compared to previous year and 10-yr (1994-2003) mean.

Season and Ecozone	Hunt Year	Zone Hunters	Harvest					Hunter Success (%)	Hunter-days	Hunter-days/ Bear
			Boars	Sows	Cubs	Unkn	Total			
SPRING										
Parkland (WMZs 35-47)	2002	63	23	21	0	0	44	69.8	241	5.5
	2003	68	24	28	0	3	55	80.9	244	4.4
	10-yr (1994-03) Mean	40	10	9	0	0	20	48.9	175	9.0
Forest Fringe (WMZs 48-55)	2002	233	91	56	1	1	149	63.9	953	6.4
	2003	224	73	82	5	0	160	71.4	860	5.4
	10-yr (1994-03) Mean	180	55	43	2	9	108	60.0	637	5.9
Forest (WMZs 56-73)	2002	1,862	884	373	0	24	1,281	68.8	7,238	5.7
	2003	1,771	897	370	2	23	1,292	73.0	6,784	5.3
	10-yr (1994-03) Mean	1,516	675	331	2	69	1,076	71.0	5,396	5.0
Shield (WMZs 74-76)	2002	100	70	16	0	0	86	86.0	364	4.2
	2003	52	36	9	0	0	45	86.5	175	3.9
	10-yr (1994-03) Mean	49	31	5	0	2	38	77.3	186	4.9
SPRING TOTAL	2002	2,258	1,068	466	1	25	1,560	69.1	8,797	5.6
	2003	2,115	1,030	489	7	26	1,552	73.4	8,063	5.2
	10-yr (1994-03) Mean	1,788	772	388	4	80	1,243	69.5	6,614	5.3
FALL										
Parkland (WMZs 35-47)	2002	17	5	8	0	0	13	76.5	64	4.9
	2003	23	16	3	0	0	19	82.6	65	3.4
	10-yr (1994-03) Mean	18	6	4	1	2	12	65.9	66	5.6
Forest Fringe (WMZs 48-55)	2002	70	37	16	0	0	53	75.7	215	4.1
	2003	43	27	8	0	0	35	81.4	152	4.3
	10-yr (1994-03) Mean	65	27	16	0	1	44	67.1	203	4.7
Forest (WMZs 56-73)	2002	243	134	48	0	4	186	76.5	986	5.3
	2003	284	137	51	0	4	192	67.6	1,029	5.4
	10-yr (1994-03) Mean	218	93	44	0	16	152	69.6	770	5.1
Shield (WMZs 74-76)	2002	4	1	0	0	0	1	25.0	33	33.0
	2003	nr	nr	nr	nr	nr	nr	nr	nr	nr
	10-yr (1994-03) Mean	8	3	0	0	0	3	41.3	38	11.1
FALL TOTAL	2002	334	177	72	0	4	253	75.8	1,298	6.4
	2003	350	180	62	0	4	246	70.3	1,246	5.1
	10-yr (1994-03) Mean	310	128	63	1	19	211	68.0	1,077	5.1

nr = no records

Table 9. Total licensed harvest (does not include subsistence harvest or nuisance bears), 1984-2003.

Hunt Year	Licensed Harvest					
	Saskatchewan Residents					
	Hunted	Free Permits	Commercial Trapping	Canadian Residents	Non-residents	Total Licensed Harvest
1984	1,778	0	272	?	?	2,050 +
1985	892	147	378	35	216	1,668
1986	1,968	423	345	49	324	3,109
1987	1,338	333	250	52	655	2,628
1988	1,257	0	174	51	585	2,067
1989	805	0	178	38	563	1,584
1990	821	0	268	35	565	1,689
1991	596	0	259	23	605	1,483
1992	597	0	302	24	663	1,586
1993	646	0	276	41	923	1,886
1994	463	0	110	31	960	1,564
1995	539	0	100	18	1,005	1,659
1996	681	0	100	39	1,220	2,040
1997	747	0	103	41	1,389	2,280
1998	773	0	58	41	1,490	2,362
1999	499	0	69	25	1,723	2,316
2000	522	0	242	59	1,741	2,565
2001	495	0	151	35	1,689	2,372
2002	535	0	125 [a]	55	1,813	2,527
2003	483	0	63	63	1,798	2,407
10-yr (1994-03) Mean	571	0	112	41	1,483	2,207

[a] Estimated harvest as of December 2003

3.0 Management Strategies

- Monitor Saskatchewan resident hunting activity and harvest using the annual Hunter Harvest Survey, and monitor non-resident hunting activity and harvest using Outfitter Client Reports. These data are used to calculate population indicators to assess the status of black bear populations.

- To sustain a stable black bear population in Saskatchewan, the annual licensed harvest should remain near 2,100±10% bears. Harvest during the past 5 years has exceeded this limit. Therefore, population indices and harvest levels should be closely monitored to assess if continued high harvests in future years are sustainable, or whether a change of allocation strategy is required.

- Status and management of bears needs to be reviewed in Saskatchewan, including establishment of area-specific population and sustainable harvest objectives. Currently population estimates and harvest objectives are interim estimates.

- Collect data (sex, age, location) on number of nuisance bears that are destroyed annually as a means of monitoring the level and types of damage caused by bears, and to assist with management decisions on population regulation.

Upland Birds

1.0 Long-term Management Objectives

There is no long-term management plan or population objectives for any of the upland bird species.

2.0 Population Status

There are no coordinated/systematic population surveys conducted for any upland bird species. Current management is limited to harvest monitoring.

2.1 Mortality

2.1.1 License Sales

Table 1. Summary of provincial upland bird license sales, 1984–2003.

	Upland Bird License Sales			
Hunt Year	Saskatchewan Resident	Canadian Resident	Non-Resident	Total License Sales
1984	40,102	2,125	3,277	45,504
1985	38,243	2,181	3,497	43,921
1986	41,317	2,158	3,731	47,206
1987	35,190	2,029	3,895	41,114
1988	32,077	1,648	3,031	36,756
1989	29,479	1,600	3,284	34,363
1990	26,827	1,619	3,280	31,726
1991	24,442	1,726	3,632	29,800
1992	22,483	1,754	3,715	27,952
1993	19,454	1,643	4,119	25,216
1994	20,187	1,696	4,363	26,246
1995	21,374	1,643	4,977	27,994
1996	18,064	1,756	5,994	25,814
1997	17,150	1,689	6,886	25,725
1998	19,154	1,749	7,964	28,867
1999	16,664	1,708	9,750	28,122
2000	15,018	1,678	10,539	27,235
2001	13,573	1,475	8,296	23,344
2002	12,462	1,443	8,666	22,571
2003	14,231	1,583	10,148	25,962
10 - yr (1994-03) Mean	16,788	1,642	7,758	26,188

2.1.2 Hunting Activity and Harvest

Annual resident upland bird harvest and hunter effort is summarized in Figure 2. The Hunter Harvest Survey did not adequately sample Canadian and non-resident hunters to report harvest or hunting activity for those groups. There is no measure of subsistence upland bird harvest.

Table 2. Saskatchewan resident annual upland bird harvest and hunter-effort, 1984-2003.

Hunt Year	Sharp-tailed Grouse				Ruffed Grouse				Spruce Grouse			
	Zone Hunters	Harvest	H-days	Harvest/ H-day	Zone Hunters	Harvest	H-days	Harvest/ H-day	Zone Hunters	Harvest	H-days	Harvest/ H-days
1984	14,756	46,476	15,263	3.04	6,298	11,880	4,219	2.82	1,522	4,308	1,323	3.26
1985	14,216	36,768	14,570	2.52	6,083	14,294	5,090	2.81	1,340	4,200	1,300	3.23
1986	19,446	68,824	24,822	2.77	9,618	46,350	12,155	3.81	2,762	11,749	3,154	3.73
1987	15,556	65,341	21,565	3.03	10,163	83,186	17,148	4.85	2,942	13,385	3,583	3.74
1988	15,095	43,278	16,184	2.67	12,194	82,891	20,459	4.05	3,394	14,470	3,803	3.80
1989	13,790	41,369	24,093	1.72	11,540	68,441	18,297	3.74	3,500	10,041	3,448	2.91
1990	20,250	42,171	32,001	1.32	11,721	26,696	16,135	1.65	2,431	3,708	2,812	1.32
1991	18,940	56,317	27,076	2.08	8,788	24,597	12,328	2.00	1,401	3,803	2,023	1.88
1992	11,281	27,704	15,662	1.77	5,063	10,477	6,878	1.52	872	2,205	1,090	2.02
1993	7,349	12,465	9,944	1.25	4,340	9,151	6,353	1.44	749	2,445	1,270	1.93
1994	8,113	17,655	10,520	1.68	6,916	25,996	8,463	3.07	1,466	5,415	1,849	2.93
1995	11,437	26,613	15,254	1.74	11,068	61,579	17,269	3.57	2,955	14,276	3,938	3.63
1996	8,216	20,145	11,093	1.82	10,030	55,674	16,444	3.39	2,426	12,503	4,164	3.00
1997	6,757	18,861	9,752	1.93	8,606	54,357	14,795	3.67	2,129	10,327	3,226	3.20
1998	7,301	17,666	9,530	1.85	10,230	68,832	16,787	4.10	2,292	10,017	3,336	3.00
1999	6,375	16,979	9,518	1.78	7,936	34,503	13,985	2.47	2,069	6,646	3,424	1.94
2000	7,170	15,696	10,322	1.52	6,251	22,613	11,373	1.99	1,662	5,341	2,849	1.87
2001	7,633	20,250	9,681	2.09	6,656	29,102	9,155	3.18	1,838	7,325	2,263	3.24
2002	5,226	12,534	6,535	1.92	3,572	10,230	4,709	2.17	944	3,966	1,023	3.88
2003	6,828	23,216	9,593	2.42	5,245	29,304	8,161	3.59	1,296	4,970	1,910	2.60
10 yr (1994–03) Mean	**7,506**	**18,371**	**10,158**	**1.81**	**7,350**	**36,486**	**11,590**	**3.15**	**1,802**	**7,566**	**2,659**	**2.85**

Table 2. Continued.

Hunt Year	Hungarian Partridge				Ring-neck Pheasant			
	Zone Hunters	Harvest	H-days	Harvest/ H-day	Zone Hunters	Harvest	H-days	Harvest/ H-day
1984	13,781	50,218	13,930	3.61	4,975	12,169	4,866	2.50
1985	11,458	34,971	11,205	3.12	3,704	7,084	3,325	2.13
1986	15,955	78,491	21,423	3.66	6,145	10,552	4,989	2.12
1987	13,379	81,868	21,683	3.78	7,112	16,419	7,166	2.29
1988	12,992	63,112	17,614	3.58	4,491	11,160	5,170	2.16
1989	12,550	50,325	22,584	2.23	4,098	10,378	6,719	1.54
1990	18,975	57,219	27,553	2.08	5,322	10,722	8,268	1.30
1991	16,114	71,195	23,332	3.05	5,484	15,864	9,266	1.71
1992	9,606	35,945	13,655	2.63	4,312	12,296	7,206	1.71
1993	6,855	20,512	9,605	2.14	3,373	9,012	5,547	1.62
1994	6,167	12,464	7,809	1.60	3,502	7,604	5,164	1.47
1995	9,625	27,599	12,262	2.25	4,812	12,922	7,571	1.71
1996	6,519	19,740	8,681	2.27	3,864	13,585	6,709	2.02
1997	4,154	11,956	5,851	2.04	2,119	3,513	3,378	1.04
1998	5,135	15,037	6,363	2.36	1,732	3,076	2,491	1.23
1999	5,273	18,065	7,600	2.38	2,208	4,400	4,005	1.10
2000	5,968	19,269	8,350	2.31	2,052	5,312	3,290	1.61
2001	6,399	25,610	8,468	3.02	2,044	4,638	3,175	1.46
2002	4,690	16,950	5,844	2.90	1,369	3,368	1,838	1.83
2003	6,841	35,295	9,841	3.59	2,278	7,423	3,852	1.93
10 yr (1994 – 03) Mean	**6,148**	**20,227**	**8,243**	**2.45**	**2,668**	**6,805**	**4,275**	**1.59**

3.0 Management Strategies

- Freeze resident hunter daily limits to 3 for sharp-tailed grouse, 10 for ruffed grouse, 10 for spruce grouse, 6 of Hungarian partridge, with possession limit = 2 times daily limit.
- Freeze non-resident daily limits to same as residents, with season limit = 2 times daily limit.
- Adjust harvest using season length.
- Continue monitoring resident harvest and hunter effort annually.